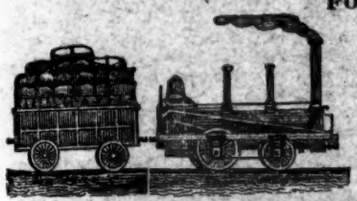
AMERICAN RAILROAD JOURNAL,

AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY, AND MINES.



ESTABLISHED 1831.

PUBLISHED WEEKLY, AT No. 23 CHAMBERS STREET, NEW YORK, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II., No. 23.] SATURDAY, JUNE 6, 1846. [WHOLE No. 519, VOL. XIX.

BOSTON AND PROVIDENCE RAILroad. Passenger Notice. Summer Arrangement. On and after Monday, April 6, 1846, the Passenger Trains will run as follows:

For New York—Night Line, via Stonington. Leaves Boston every day, but Sunday, at 5 p.m.

Accommodation Trains, leave Boston at 7½ a.m. and 4 p.m., and Providence at 8 a.m. and 4½ p.m.

Dedham trains, leave Boston at 8 a.m. 12½ m., 3½ p.m., and 6½ p.m. Leave Dedham at 7 a.m. and 9½ a.m. and 2½ and 5½ p.m.

Stoughton trains, leave Boston at 11½ a.m. and 5½ p.m. Leave Stoughton at 7·20 a.m. and 3½ p.m.

All baggage at the risk of the owners thereof.

31 1y W. RAYMOND LEE, *Sup't.*

BRANCH RAILROAD and STAGES CONnecting with the Boston and Providence Railroad.

Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

NORWICH AND WORCESTER RAILRoad. Summer Arrangement, commencing Monday, April 6, 1846.

Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½ p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

☞ The morning Accommodation Trains from Norwich, and from Worcester, connect with the trains of the Boston, and Worcester and Western railroads each way.

The Evening Accommodation Train from Worcester connects with the 1½ p.m. train from Boston.

New York Train via Long Island Railroad: Leave Allyn's Point for Boston, about 1 p.m., daily, except Sunday.

Leave Worcester for New York, about 10 a.m., stopping at Webster, Danielsonville, and Norwich.

New York Train via Steamboat—Leave Norwich for Boston, every morning, except Monday, on the arrival of the stamboat from New York, stopping at Norwich and Danielsonville.

Leave Worcester for New York, upon the arrival of the train from Boston, at about 4½ p.m., daily, except Sunday, stopping at Webster, Danielsonville and Norwich.

Freight Trains daily each way, except Sunday.—Special contracts will be made for cargoes, or large quanties of freight, on application to the superintendent.

☞ *Fares are Less when paid for Tickets than when paid in the Cars.* ☜

32 1y J. W. STOWELL, Sup't.

BOSTON AND MAINE RAILROAD. Upper Route, Boston to Portland via, Reading, Andover, Haverhill, Exeter, Dover, Great Falls, South & North Berwick, Wells, Kennebunk and Saco.

Summer Arrangement, 1846.

On and after April 13, 1846, Passenger Trains will leave daily, (Sundays excepted,) as follows:

Boston for Portland at 7½ a.m. and 2½ p.m.

Boston for Great Falls at 7½ a.m., 2½ and 4½ p.m.

Boston for Haverhill at 7½ and 11½ a.m., 2½, 4½ and 6 p.m.

Boston for Reading at 7½, 9, and 11½ a.m., 2½, 4½, 6 and 8 p.m.

Portland for Boston at 7½ a.m., and 3 p.m.

Great Falls for Boston at 6½ and 9½ a.m., and 4½ p.m.

Haverhill for Boston at 6½, 8½, and 11 a.m., and 4 and 6½ p.m.

Reading for Boston at 6½, 7½ and 9½ a.m., 12 m., 1½, 5 and 7½ p.m.

The Depot in Boston is on Haymarket Square.

Passengers are not allowed to carry Baggage above $50 in value, and that *personal* Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every $500 additional value. CHAS. MINOT, *Sup't.*

GEORGIA RAILROAD. FROM AUGUSTA to ATLANTA—171 MILES. AND WESTERN AND ATLANTIC RAILROAD FROM ATLANTA TO OOTHCALOGA, 80 MILES.

This Road in connection with the South Carolina Railroad and Western and Atlantic Railroad now forms a continuous line, 388 miles in length, from Charleston to Oothcaloga on the Oostenaula River, in Cass Co., Georgia.

Rates of Freight, and Passage from Augusta to Oothcaloga.

On Boxes of Hats, Bonnets, and Furniture per foot	16 cts.
" Dry goods, shoes, saddlery, drugs, etc., per 100 lbs.	95 "
" Sugar, coffee, iron, hardware, etc.	65 "
" Flour, bacon, mill machinery, grindstones, etc.	33½ "
" Molasses, per hogshead $9·50; salt per bus.	20 "
" Ploughs and cornshellers, each	75 "

Passengers $10·50; children under 12 years of age half price.

Passengers to Atlanta, head of Ga. Railroad, $7.

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Co. will be forwarded free of commissions. Freight may be paid at Augusta, Atlanta, or Oothcaloga.

J. EDGAR THOMSON,
Ch. Eng. and Gen. Agent.

Augusta, Oct. 21 1845. •44 1y

SUMMER ARRANGEMENT.—NEW YORK AND ERIE RAILROAD LINE, from April 1st until further notice, will run daily (Sundays excepted) between the city of New York and Middletown, Goshen, and intermediate places, as follows:

FOR PASSENGERS—

Leave New York at 7 A.M. and 4 P.M.
" Middletown at 6½ A.M. and 5½ P.M.

FARE REDUCED to $1 25 to Middletown—way in proportion. Breakfast, supper and berths can be had on the steamboat.

FOR FREIGHT—

Leave New York at 5 P.M.
" Middletown at 12 M.

The names of the consignee and of the station where to be left, must be distinctly marked upon each article shipped. Freight not received after 5 P. M. in New York.

Apply to J. F. Clarkson, agent, at office corner of Duane and West sts.

H. C. SEYMOUR, Sup't.

March 25th, 1846.

Stages run daily from Middletown, on the arrival of the afternoon train, to Milford, Carbondale, Honesdale, Montrose, Towanda, Owego, and West; also to Monticello, Windsor, Binghamton, Ithaca, etc., etc. Agent on board. 13 tf

BALTIMORE AND OHIO RAILROAD. MAIN STEM. The Train carrying the Great Western Mail leaves Baltimore every morning at 7½ and Cumberland at 8 o'clock, passing Ellicott's Mills, Frederick, Harpers Ferry, Martinsburgh and Hancock, connecting daily each way with—the Washington Trains at the Relay House seven miles from Baltimore, with the Winchester Trains at Harpers Ferry — with the various railroad and steamboat lines between Baltimore and Philadelphia and with the lines of Post Coaches between Cumberland and Wheeling and the fine Steamboats on the Monongahela Slack Water between Brownsville and Pittsburgh. Time of arrival at both Cumberland and Baltimore 5½ P. M. Fare between those points $7, and 4 cents per mile for less distances. Fare through to Wheeling $11 and time about 36 hours, to Pittsburgh $10, and time about 32 hours. Through tickets from Philadelphia to Wheeling $13, to Pittsburgh $12. Extra train daily except Sundays from Baltimore to Frederick at 4 P. M., and from Frederick to Baltimore at 8 A. M.

WASHINGTON BRANCH.

Daily trains at 9 A. M. and 5 P. M. and 12 at night from Baltimore and at 6 A. M. and 5½ P. M. from Washington, connecting daily with the lines North, South and West, at Baltimore, Washington and the Relay house. Fare $1 60 through between Baltimore and Washington, in either direction, 4 cents per mile for intermediate distances. s13y1

BALTIMORE AND SUSQUEHANNA Railroad. The Passenger train runs daily except Sunday, as follows:

Leaves Baltimore at 9 a.m., and arrives at 6¼ p.m. Arrives at York at 12¼ p.m., and leaves for Columbia at 1¼ p.m. Leaves Columbia at 2 p.m., and leaves York for Baltimore at 3 p.m. Fare to York $2. Wrightsville $2 50, and Columbia $2 62½. The train connects at York with stages for Harrisburg, Gettysburg, Chambersburg, Pittsburg and York Springs.

Fare to Pittsburg. The company is authorized by the proprietors of Passenger lines on the Pennsylvania improvements, to receive the fare for the whole distance from Baltimore to Pittsburg. Baltimore to Pittsburg.—Fare through, $9 and $10.

Afternoon train. This train leaves the ticket office daily, Sundays excepted, at 3½ p.m. for Cockeysville, Parkton, Green Springs, Owings' Mills, etc.

Returning, leaves Parkton at 6 and Cockeysville and Owings' Mills at 7, arriving in Baltimore at 9 o'clock a.m.

Tickets for the round trip to and from any point can be procured from the agents at the ticket offices or from the conductors in the cars. The fare when tickets are thus procured, will be 25 per cent. less, and the tickets will be good for the same and following da- any passenger train.

D. C. H. BORDLEY, *Sup't.*
31 1y Ticket Office, 63 North st.

CENTRAL RAILROAD—FROM SAVANNAH to Macon. Distance 190 miles.

This Road is open for the transportation of Passengers and Freight. Rates of Passage, $8 00. Freight—

On weight goods generally...	50 cts. per hundred.
On measurement goods.....	13 cts. per cubic ft.
On bris. wet (except molasses and oil).....	$1 50 per barrel.
On bris. dry (except lime)...	80 cts. per barrel.
On iron in pigs or bars, castings for mills, and unboxed machinery.....	40 cts. per hundred.
On hhds. and pipes of liquor, not over 120 gallons.....	$5 00 per hhd.
On molasses and oil.....	$6 00 per hhd.

Goods addressed to F. WINTER, Agent, forwarded free of commission. THOMAS PURSE,
40 Gen'l. Sup't. Transportation.

NEW YORK & HARLEM RAILROAD CO.—Summer Arrangement.

On and after Friday, May 1st, 1846, the cars will run as follows:

Leave City Hall for Yorkville, Harlem and Morrianna, at 7, 8, 9, 10 and 11 a. m., and at 1, 2, 3 30, 4 30, 5, 6, and 6 30 p. m.

Leave City Hall for Fordham and Williams' Bridge, at 7, 10 and 11 a. m., and at 2, 3 30, 5, and 6 30 p. m.

Leave City Hall for Hunt's Bridge, Bronx, Tuckahoe, Hart's Corners and White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

Leave Harlem and Yorkville, at 7 10, 8 10, 9, 10, 11 10 a. m., and at 12 40, 2, 3 10, 5 10, 5 30, 6 10, and 7 p. m.

Leave Williams' Bridge and Fordham, at 6 45, 7 45, and 10 45 a. m., and at 12 15, 2 45, 4 45, and 5 45 p. m.

Leave White Plains, at 7 and 10 a. m., and at 2 and 5 p. m.

The freight train will leave the City Hall at 1 o'clock, p. m., and leave White Plains at 1 o'clock in the morning.

On Sundays, the White Plains train will leave the City Hall at 7 a. m. and 5 30 p. m.; will leave White Plains at 7 a. m. and 6 p. m.

On Sundays, the Harlem and Williams' Bridge trains will be regulated according to the state of the weather. 18

RAILROAD IRON.—THE "MONTOUR Iron Company," Danville, Pa., is prepared to execute orders for the heavy Rail Bars of any pattern now in use, in this country or in Europe, and equal in every respect in point of quality. Apply to MURDOCK, LEAVITT & CO., *Agents.*
Corner of Cedar and Greenwich Sts. 43 1y

LITTLE MIAMI RAILROAD.—1846.—Summer Arrangement.

Two passenger trains daily.

On and after Tuesday, May 5th, until further notice, two passenger trains will be run—leaving Cincinnati daily (Sundays excepted) at 9 a. m. and 1½ p. m. Returning, will leave Xenia at 5 o'clock 50 min. a. m., and 2 o'clock 40 min. p.m.

On Sundays, but one train will be run—leaving Cincinnati at 9, and Xenia at 5 50 min. a. m.

Both trains connect with Neil, Moore & Co.'s daily line of stages to Columbus, Zanesville, Wheeling, Cleveland, Sandusky City and Springfield.

Tickets may be procured at the depot on East Front street.

The company will not be responsible for baggage beyond fifty dollars in value, unless the same is returned to the conductor or agent, and freight paid at the rate of a passage for every $500 in value above that amount. W. H. CLEMENT,
19 Superintendent.

CALIGRAPHIC BLACK LEAD PENcil, Manufactured by E. Wolff and Son, 23 Church Street, Spitalfields, London.

The Caligraphic Pencils have been invented by E. Wolff and Son, after the expenditure of much time and labor. They are the result of many experments; and every effort that ingenuity and experience could suggest, has been made to insure the highest degree of excellence, and the profession may rely upon their being all that can be desired.

They are perfectly free from grit; and for richness of tone, depth of color, delicacy of tint, and evenness of texture, they are not to be equalled by the best Cumberland Lead that can be obtained at the present time, and are infinitely superior to every other description of Pencil now in use.

The Caligraphic Pencils will also recommend themselves to all who use the Black Lead Pencils as an instrument of professional importance or recreation, by their being little more than half the price of other pencils.

An allowance will be made on every groce purchased by Artists or Teachers.

May be had of all Artists, Colourmen, Stationers, Booksellers, etc.

A single pencil will be forwarded as a sample, upon the receipt of postage stamps to the amount.

Caution.—To prevent imposition, a highly finished and embossed protection wrapper, difficult of imitation, is put around each dozen of Pencils. Each Pencil will be stamped on both sides, "Caligraphic Black Lead, E. Wolff and Son, London."

The subscriber has on hand a full supply of Wolff and Sons celebrated Creta Laevis, or Colored Drawing Chalks, also their pure Cumberland Lead and extra prepared Lead Pencils, and Mathematical Lead Pencils.

P. A. MESIER,
Stationer and Sole Agent,
No. 49 Wall Street.

N. B.—A complete assortment of Steven's *Genuine* Inks, Fluids, Imitating Wood stains, and Graining Colours at the Manufacturers prices.

KEARNEY FIRE BRICK. F. W. BRINLEY, Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire, Peter Cooper, Murdock, Leavirt & Co. } New York.
J. Triplett & Son, Richmond, Va.
J. R. Anderson, Tredegar Iron Works, Richmond, Va.
J. Patton, Jr. Colwell & Co. } Philadelphia, Pa.
J. M. L. & W. H. Scovill, Waterbury, Con.
N. E. Screw Co. Eagle Screw Co. } Provicence, R. I.
William Parker, Supt. Bost. and Worc. R. R.
New Jersey Malleable Iron Co., Newark, N. J.
Gardiner, Harrison & Co. Newark, N. J.

25,000 to 30,000 made weekly. 35 1y

FLAT BAR, ENGLISH ROLLED, RAILroad Iron, 2½ × ½—a large part suitable to relay. For sale by C. J. F. BINNEY,
Commission Merchant, 1 City Wharf,
11 1m Boston, Mass

TROY AND GREENBUSH RAILROAD. Spring Arrangement. Trains will be run on this Road as follows, until further notice, Sundays excepted.

Leave Troy at	6½	A.M.	Leave Albany at	7	A.M.
" "	7½	"	" "	8	"
" "	8½	"	" "	9	"
" "	9½	"	" "	10	"
" "	10½	"	" "	11	"
" "	11½	"	" "	12	M.
" "	1	P.M.	" "	1½	P.M.
" "	2	"	" "	2½	"
" "	3	"	" "	3½	"
" "	4	"	" "	4½	"
" "	5	"	" "	5½	"
" "	5½	"	" "	6	"
" "	6½	"	" "	7	"

☞ The 6½ a.m. and 2 o'clock p.m. runs from Troy, to Boston runs.

The 12 m. and 6 o'clock p.m. trains from Boston runs.

☞ Passengers from Albany will leave in the Boston Ferry Boat at the foot of Maiden Lane, which starts promptly at the time above advertised.

Passengers will be taken and left at the principal Hotels in River Street, in Troy, and at the Nail Works and Bath Ferry.

L. R. SARGENT,
Superintendent.
Troy, April 1st, 1846. 14 1y

MACHINE WORKS OF ROGERS, Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works being extensive and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

Railroad Work.

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery

of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally; hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
a45 Paterson, N. J., or 60 Wall street, N. York.

TO RAILROAD COMPANIES AND MANufacturers of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside. THOMAS & EDMUND GEORGE,
j:45 N. E. cor. 12th and Market sts., Philad., Pa.

THE SUBSCRIBERS, AGENTS FOR the sale of

Codorus, Glendon, Spring Mill and Valley, } Pig Iron.

Have now a supply, and respectfully solicit the patronage of persons engaged in the making of Machinery, for which purpose the above makes of Pig Iron are particularly adapted.

They are also sole Agents for Watson's celebrated Fire Bricks and prepared Kaolin or Fire Clay, orders for which are promptly supplied.

SAM'L. KIMBER, & CO.,
59 North Wharves,
Jan. 14, 1846. [1y4] *Philadelphia, Pa.*

RAILROAD IRON AND LOCOMOTIVE Tyres imported to order and constantly on hand by A. & G. RALSTON
Mar. 20tf 4 South Front St., Philadelphia.

THE NEWCASTLE MANUFACTURING Company continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention. ANDREW C. GRAY,
a45 President of the Newcastle Manuf. Co.

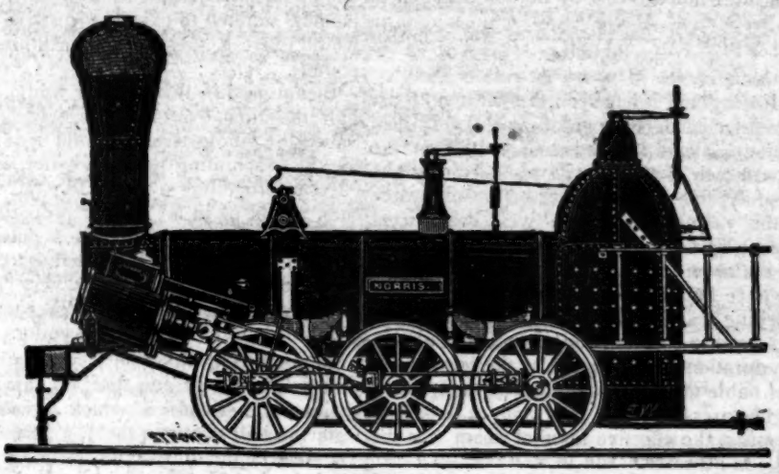
CUSHMAN'S COMPOUND IRON RAILS- etc. The Subscriber having made important improvements in the construction of rails, mode of guarding against accidents from insecure joints, etc. —respectfully offers to dispose of Company, State Rights, etc., under the privileges of *letters patent* to Railroad Companies, Iron Founders, and others interested in the works to which the same relate. Companies reconstructing their tracks now have an opportunity of *improving* their roads on terms very advantageous to the varied interests connected with their construction and operation; roads having in use flat bar rails are particularly interested, as such are permanently available by the plan.

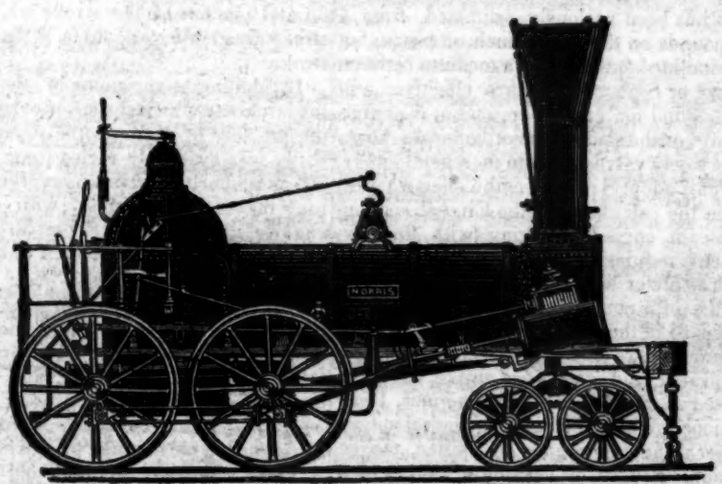
W. Mc. C. CUSHMAN, *Civil Engineer*,
Albany, N. Y.

Mr. C. also announces that Railroads, and other works pertaining to the profession, may be constructed under his advice or personal supervision. Applicaitons must be post paid.

NORRIS' LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.





MANUFACTURE their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following descriptions, viz:

Class	1,	15	inches	Diameter of	Cylinder,	× 20	inches	Stroke.
"	2,	14	"	"	"	× 24	"	"
"	3,	14½	"	"	"	× 20	"	"
"	4,	12½	"	"	"	× 20	"	"
"	5,	11½	"	"	"	× 20	"	"
"	6,	10½	"	"	"	× 18	"	"

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion.

Castings of all kinds made to order: and they call attention to their Chilled Wheels or the Trucks of Locomotives, Tenders and Cars.

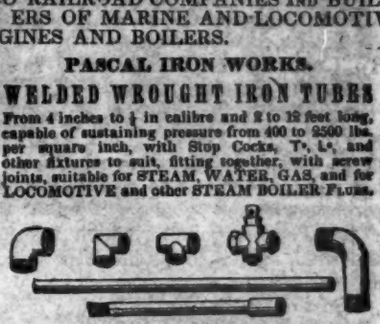
NORRIS, BROTHERS.

TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.

PASCAL IRON WORKS.

WELDED WROUGHT IRON TUBES

From 4 inches to ¼ in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T's, L's, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER Flues.



Manufactured and for sale by
HORRIS, TASKER & HORRIS.
Warehouse S. E. Corner of Third & Walnut Streets,
PHILADELPHIA.

GREAT SOUTHERN MAIL LINE! VIA Washington city, Richmond, Petersburg, Weldon and Charleston, S. C., direct to New Orleans. The only Line which carries the Great Southern Mail, and Twenty-four Hours in advance of Bay Line, leaving Baltimore same day.

Passengers leaving New York at 4½ P.M., Philadelphia at 10 P.M., and Baltimore at 6½ A.M., proceed without delay at any point, by this line, reaching Richmond in *eleven*, Petersburg in *thirteen and a half hours*, and Charleston, S. C., in *two days* from Baltimore.

Fare from Baltimore to Charleston.....$21 00
" " " Richmond..... 6 60

For Tickets, or further information, apply at the *Southern Ticket Office*, adjoining the *Washington Railroad Office*, Pratt street, Baltimore, to
STOCTON & FALLS, Agents.

GEORGE VAIL & CO., SPEEDWELL IRON Works, Morristown, Morris Co., N. J.—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1¼ in. to 2½ in thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descriptions.
ja451y

NICOLL'S PATENT SAFETY SWITCH for Railroad Turnouts. This invention, for some time in successful operation on one of the principal railroads in the country, effectually prevents engines and their trains from running off the track at a switch, left wrong by accident or design.

It acts independently of the main track rails, being laid down, or removed, without cutting or displacing them.

It is never touched by passing trains, except when in use, preventing their running off the track. It is simple in its construction and operation, requiring only two Castings and two Rails; the latter, even if much worn or used, not objectionable.

Working Models of the Safety Switch may be seen at Messrs. Davenport and Bridges, Cambridgeport, Mass., and at the office of the Railroad Journal, New York.

Plans, Specifications, and all information obtained on application to the Subscriber, Inventor, and Patentee. G. A. NICOLLS,
ja45 *Reading, Pa.*

RAILROAD IRON WANTED. WANted, 50 tons of Light Flat Bar Railroad Iron. The advertisers would prefer second-hand iron, if not too much worn. Address Box 384 Philadelphia P. O.—Post paid. 8 4t

(From the Journal of the Franklin Institute, for April.)

Civil Engineering--Steam Navigation.

[Continued from page 348.]

To Com. Lewis Warrington, *Board of Navy Commissioners, Washington.*

Sir:—Your letter of 3rd September last was received. The reply has been delayed by an attack of fever and ague, which I must beg you to receive as an apology for the apparent neglect.

1st. The first point on which information is desired, relates to the horse power of the engine.

This query is not altogether definite—whether referring to the estimate of horse power, as used in this country, compared with that used in England, or the comparative horse power in regard to the tonnage of the steamers. I shall therefore first endeavor to give you a simple explanation of the horse power of steam engines, and the basis of the calculation.

In order to form an accurate estimate of the power necessary to drive machinery of various kinds, saw mills, grist mills, cotton factories and subsequently steamboats, it occurred to Mr. Watt, who brought the steam engine into practical use, to fix upon an unit of power, and as horses were much used for driving machinery, the power of a horse was chosen as the unit. After various experiments he decided the average working power of a horse to be equal to raising 33,000 lbs. avoirdupoise, over a pully one foot high in one minute of time.

This force has subsequently been adopted as the unit, or horse power, in most of the books on mechanics, and is used, whether the propelling force be wind, water, or steam; and the principle of the calculation is to reduce the whole force exerted into pounds weight, moving at the rate of one foot space in one minute of time, which divided by 33,000 pounds, the unit, or horse power, gives the number of horses power exerted; and this compared with the number of horses power required to perform the duty desired, enables the engineer to regulate the power of his machinery, to produce the result required.—In estimating the power of the steam engine, it evidently rests upon two points; first, the effective pressure, or actual force in pounds exerted on the piston, after deducting the waste of friction and loss of power of the steam by the radiation of heat from surfaces exposed to the atmosphere, together with the resistance of the atmosphere against a vacuum.

Secondly, The speed at which the force of steam on the piston is capable of moving the piston—these two requisites, viz: effective pressure on the surface of the piston, taken in pounds on the number of square inches contained in the piston, combined with the velocity *in feet* per minute at which the piston moves, form the total power of the engine, which divided by the unit of power of one horse, or 33,000 pounds, gives the number of horses power; from which results the simple formula.

To ascertain the number of horses power of a steam engine, multiply the area of the piston in square inches by the effective pressure on each square inch of the piston, and the product by the velocity or number of feet per minute the piston moves.

The result is, the full force exerted, taken at the velocity of one foot per minute, and divided by 33,000, gives the number of horses power; in other words—D, diameter of cylinder in inches; F, effective force in pounds or square inch of cylinder; V, velocity in feet per minute at which the piston moves; the theorem then follows, $D^2 \times .7854$ area of cylinder or piston in square inches.

V, velocity, length of stroke in feet multiplied by the number of strokes per minute, multiplied by 2, for the up stroke and the down stroke, equal the number of feet passed through in one minute of time.

A, area of cylinder in square inches, multiplied by F, the product multiplied by V, and the whole divided by 33,000 number of horses power, $\frac{A \times F \times V}{33{,}000}$ = No. of horses power.

In England it has been the custom to use steam for condensing engines at a very low pressure, about 2 pounds to 3 pounds on the square inch of the safety valve, resting the chief dependence for power on the force force of the vacuum, which in well constructed steam engines exerts a force of 13 to 14 lbs. on the square inch of the piston, without allowance for waste or friction. This plan of working was found to be most economical in regard to consumption of fuel, and also in the duration of the engine, as the joints were less liable to be put out of order, than with a higher pressure; and working at this low pressure, the effective force of steam was the *same* in all cases.

The effective force of steam exerted on the piston has been variously estimated, from 7 to 9 pounds on the square inch of piston, but I am inclined to think that a medium between the two, or 8 pounds pressure effective, will not be found too great in engines at 5 pounds pressure on the square inch of boiler, as shown by the safety valve, or steam mercurial gauge, and shall adopt 8 pounds as the effective pressure in the calculation of the English condensing steam engines working with the government regulation of safety valve, one of which is under lock and key and opens at a pressure of 5 pounds on the square inch.—The speed of the piston is generally taken as the same where the length of crank or stroke is the same, and with 7 feet stroke, the longest used in the British marine engines, 15 revolutions are allowed, making the velocity in feet per minute at which the piston moves, 15 double strokes, or 30 single strokes of 7 feet = 210 feet per minute, which is the speed of the pistons of the Great Western steam packet which has now run for three years with most extraordinary regularity between this city and Bristol, Eng.

The ingenuity of American engineers (who choose to think and judge for themselves without regard to the laws established by Messrs. Bolton & Watt, which English engineers do not venture to question or swerve from) discovered that steam of a high pressure used expansively, (that is the full force of the steam in the boiler suffered to act upon the piston for a certain portion of the stroke, then shut off and suffered to expand for the remainder of the stroke, after the communication with the boiler had been shut off, by a very simple contrivance called the half stroke or cut off valve, was peculiarly adapted for the propelling of boats) adopted the plan of working with an additional pressure of steam in the boiler.

This in the first instance, was suffered to act with full force on the piston for half the length of stroke, when the communication with the boiler or source of supply of steam was shut off, and the steam in the cylinder sufficient to continue the power for the remainder of the stroke by its known quality of expansion, which was found to be in the direct ratio of the increase of bulk, that is, one cubic foot of steam at a pressure of ten pounds, suffered to expand to two cubic feet, would exert a pressure of very nearly five pounds.

Steam used in this manner would, for one half the time, exert a power, which, if continued the whole stroke, would require double the evaporating power of boiler, while the effect in propelling a vessel, like the action of oars, would be in far greater proportion than one half; since the vessel once put in rapid motion, will by its own momentum continue its velocity through the water, very little diminished before the next stroke commences with full force of steam of the boiler.

In practice it was soon found that the engine acted with greater force by varying the position of the stroke at which it was cut off from the half stroke to the $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, and in the De Witt Clinton steamer, running on the Hudson river, I have known the steam cut off at 16 inches of the stroke while the full stroke was ten feet, equal to $\frac{2}{15}$ths of the full stroke.

In addition to variations in the position of the stroke at which the steam was cut off, the the pressure of steam on the square inch of boiler was gradually varied from 3 to 10, 20, 30, and latterly I have known the boats running on the Hudson river, with condensing engines, using steam at a pressure of 40 and 50 pounds on the square inch of boiler.

It is obvious that with so great variation in the source of power, the pressure of steam, that there could be no comparison of horse power derived from the mere diameter of cylinder and length of stroke, and the consequence has been that the use of the term of *horses power* has been abandoned with us in connection with the boat or marine engines.

Twenty years observation and experience of the changes which have been made in the same engines and boats, by substituting cylinders of larger diameter (by which the pressure of steam used has been reduced, and this with advantage to the speed of the vessel, with the same consumption of fuel,) satisfied me that there is a limit of pressure of steam, which combines the advantage of speed with an additional security, both against the leakage of joints and against accident by the straining of boilers, which at a pressure of 50 pounds on the square inch will require

more frequent repair and be more liable to leak at a less pressure.

I would venture therefore to suggest to the board the propriety of adhering to the English plan of designating the power of the steam engine, by the established comparison of *horse power* as used in all other cases of machinery, and to enable you to hold the comparison just, in all cases, recommend that 10 pounds pressure on the square inch of the boiler be adopted as the standard or limit of pressure for the marine condensing engines of the navy, working expansively, and cut off at ½ the length of the stroke.

This will give a constant effective pressure on the square inch of piston of about 9·9 lbs.

To render the comparison between the engines of different length of stroke uniform, it will be necessary to establish the velocity in feet for the different lengths of stroke; for which object, as water wheels of large diameter are found more effective, I would propose to adopt 15 revolutions of the water wheel, as the speed for water wheels of about 30 feet diameter = 94 feet circumference at the extreme diameter × 15 revolutions per minute × 84870 feet velocity of exterier of wheel per hour, from which deduct ⅓, 28290, or 56·580, or $\frac{56·580}{5·280}$ = 10 7-10 miles per hour through the water, the allowance of one-third loss of speed is greater than will be found in practice with vessels of good model; but it is a safe allowance, and I do not think will differ much in the vessels "Missouri" and "Mississippi," now nearly ready. Taking 15 revolutions as the speed of these two steamers, the velocity of the piston will be as follows:

Mississippi 7 feet stroke × 2 = 14 feet × 15 = 210 feet per minute.

Missouri 10 feet stroke × 2 = 20 feet × 15 = 300 feet per minute.

And the calculation of horses power as compared with the Great Western steamer will be as follows:

"Mississippi," engine working at a pressure of 10 pounds on the square inch of boiler expansively, cutting off at ½ the length of stroke, effective pressure on the piston 9·9 lbs. on the square inch.

Diameter of piston 75 in., area	4418 sq. in.
× by velocity of piston,	210
	927780
× by effective pressure	9·9 lbs.
+ by unit of h. p. 33000 lbs.)	91850·220
Horse p'r of engine,	278·33
" "	278·33
" combined eng's,	556·66

Steamer "Missouri," cylinder 62·72 in. diameter, 10 feet stroke, 30 strokes, working at the same effective pressure.

Diameter of cylind's, 62·75, area =	3092
× velocity of piston in feet,	300
	927600
× by effeective pressure,	9·lbs. 6
33000)	9183240
Horses power of each eng.,	278·27
" "	278·27
" combined "	556·54

Steamer Great Western.

Length from fore part of figure head to after part of taffarel	236 ft.
Length between perpendiculars	212 "
Length of keel	205 "
Breadth in the clear, of paddle boxes	35 " 4 in.
Breadth over paddle boxes	59 " 8 "
Depth of hold	23 " 2 "
Tonnage measurement	1340 tons.
Length of engine room	72 ft.
Diameter of cylinder	73½ "
Length of stroke	7 ft.
Diameter of water wheel	28 " 9 in.
Number of floats	4
Depth of floats	7½ in.
Length of floats	10 ft.

The ordinary pressure of steam used by the Great Western is 3½ lbs. on the square inch of boiler, and although the arrangement; for working expansively is annexed to the engine, I believe the effective pressure of steam will not exceed 8 pounds on the square inch of piston.

The steam power, therefore, at 15 revolutions of the water wheel will be as follows:

Cylinders 73½ in. diameter—area	4242
× by velocity 7 × 2 × 15	210
	891038
× by effective pressure	8
+ by unit of horse power 33000)	7182·240
Horses power of each engine,	216
" "	216
" of combined engines,	432

In the logs of the Great Western's first voyage, published in Bristol on 4th July, 1838, the combined powers of the engines is rated by Peter Maze, chairman at a meeting of stockholders held 2d June, 1838, at 450 horses power; but the revolutions per minute in the log fall short of 15, and should rate her power beyond that now stated, 432 horses.

The Great Western's tonnage is rated at 1340 tons, but I have not at the moment access to the British calculation of tonnage for steamers, in which I believe there is an allowance made for steamers, different from that of sailing vessels. By our custom house measurement, as an ordinary sailing vessel, she would register—

Length of deck less ⅝ breadth of beam × by beam × half breadth of beam + 95 feet 212 — 21·19 = 190·81 × 35 feet 4 inches = $\frac{121356}{95}$ = 1273·7 tons burthen The proportion of horses power to the tonnage of the vessel will therefore be 1340 tons + by horses power 450 = 2·98 tons to the horse power: or 1273·7 ton + by horses power 450 = 2·93 to the horse power.

The total weight of steamer "Great Western," ready for sea, is stated at 2372 tons, and her draft of water at 2305 tons, 4, 0, 25, equal to 16 feet 8 inches; which after running for 12 months, will not be far short of 17 feet.

As this vessel appears to have been one of the fastest, and most serviceable that England has produced, I should be inclined to recommend her proportions of horse power and tonnage until the experience of the performance of our own steamers should furnish other data for estimating the relation between the horse power and tonnage, and would propose for large steamers, necessarily of much draft, one horse power to three tons of vessel; for smaller vessels the proportion of horse power to the tonnage must vary according to the model and draft of water, which may be predicated on the performance of our own steamers.

The next query—the kind of engine.

The performance of the Lightall engine, as it is called, on board the steamer "Kamschatka," lately built for the Russian government, would go to show that the objections the board appointed in 1839 (consisting, I believe, of Capt. M. C. Perry, chief engineer, Charles H. Haswell and myself) found to this plan of engine, were well founded; and I have been strengthened in this position by the opinion of all the practical steam engineers in this place.

The comparison of the kinds of engines to be used is reduced—

1. To the British form of marine engines on board the "Mississippi."

2. To the inclined form of marine engines on board the "Missouri."

3. And a very simple plan of engine, placing one cylinder forward and the other aft of the line of the water wheel and shafts—the cylinders lying at the same angle, and connected from the cross head directly with the crank pin of the crank.

The first plan has the disadvantage of a limited length of stroke, regulated by the depth of hold, which in vessels of ordinary draft and depth of hold, say 23 to 24 feet, cannot exceed 7 feet stroke to 23 feet hold. This reduces the stroke so much for vessels of light draft of water that I should prefer either of the two latter plans of engine.

The British marine engine has an additional weight of cast iron framing which increases the weight necessary for engines of the same horse power, without any equivalent, as far as I have been able to discover, as I cannot conceive the advantage of a cast iron framing, perfectly rigid and unyielding, erected upon a wood foundation, such as that of a ship, which from its nature must yield in pitching and rolling in a heavy sea.

The truth of this position has been shown by the fact of the cast iron framing of the steamer "Great Western," and I believe every other British steamer that has entered this port, having broken in certain parts, although made of a strength which it was supposed would insure it against accident.

I am therefore of opinion that either of the two last forms of engine will be found more effective with the same quantity of fuel.

The inclined form of engine as used on board the "Missouri," possesses the following advantages over the British marine engine:

1st. The engine is lighter by the difference between the cast iron framing used in the British vertical reversed beam engine, and the wood framing used in the inclined engine.

2d. The framing of the inclined engine where the cylinder is at one end of the framing, and the crank plummer block at the other end of the same pieces of framing, binds the parts more perfectly together than can be done in the British engine, inasmuch as in the

inclined there are but two points to be secured against the strain of the engine, and in the British engine there are three points. In the inclined engine the two points are the cylinder and the crank plummer block. In the British engine the cylinder, the plummer blocks for the centres on which the cast iron beams work, and the crank plummer blocks.

3d. The effective power of the engine in the inclined being directly transmitted from the cylinder to the crank without the intervention of the cast iron beams, should be greater by the difference of friction of the beams of the British engine; and having fewer journals and fewer parts, the risk of getting out of order is less than that with the British engine.

4th. The length of stroke in the inclined engine can be varied to the proportion judged most advantageous for the use of steam expansively.

5th. The wood framing of the inclined engine becomes a powerful bracing and support for the part of the vessel which has first to receive the strain of the power of the engines, and is by this means rendered the strongest part of the vessel, and least liable to change its form; while in the British engine the framing is disconnected from the sides or deck timbers of the vessel, and leaves the centre, or that part of the vessel taken up by the engine as the weakest.

6th. The cost of the inclined engine will be less than that of the British engine.

Against these several advantages I know of but two in favor of the British engine, which is, that the piston works vertically, by which it is claimed that the cylinder will wear equally in a true circle, where the packing of the piston is readily kept tight; while in the inclined position of the cylinder, the under side of the cylinder, from the weight of the piston resting upon it, is inclined to wear in that part only, and form an elliptical surface on the lower or under side.

In practice, however, the wear of the cylinder is found to be very trifling, and not sufficient to cause a leak of steam in the packing; and even should the cylinder become worn on the under side, the ingenuity of the engineer will readily compensate the deviation from the circle by additional packing on the under side.

The weight of the piston, however, is greatly reduced in its pressure on the under side of the cylinder by the support of the piston rod, which is bound at two points; at the cross head and at the gland in the cylinder cover, and the immense pressure on the surface of the pistion will in a great measure prevent the weight of the piston from producing the effect which at first sight would be expected.

The remaining advantage of the British engine is, that it takes up less length than the inclined. The cubic feet of space occupied by the two descriptions of engines will be rather in favor of the inclined engine, as the British engine takes up the whole space of the vessel from the upper deck to the keel, for its full length, while in the inclined engine the greater part of the gun deck is available.

The third kind of engine is in reality the inclined engine, altering the position of the cylinders from side to side, and one forward and one aft the crank plummer block, in line in the centre of the vessel. The length of the vessel taken up by the third plan of engine will therefore be nearly double that of the second plan of engine, and reduce the spce in width nearly in the same proportion and the engineers in attendance on the two engines must necessarily be thrown a much greater distance apart than when the engines are placed side by side.

The third plan will however take up less length of vessel in cases where the boilers can be placed in the wings outside of the engines. But in this case the boilers, from not having the intervention of the coal bunkers, will be more exposed to action of shot from the enemy.

The third form of engine dispenses with two cranks and two plummer blocks, which will reduce the weight and expense somewhat, but not to an extent to make it an object of consideration. In other respects it possesses all the advantages towards bracing the vessel which belongs to the second plan of engine.

I would therefore recommend the second and third form of engine as described, in preference to any other plan which has come within my observation; the one or the other to be adopted as the beam of the vessel may render advisable.

The third query is, whether there be single or double engines? For large steamers intended to be sent abroad I should recommend two engines; for small coasting vessels, and for the revenue service and on the lakes, I should recommend single engines.

Fourth query. Should it be high or low pressure? The high pressure engine possesses no advantage over the condensing, beyond the small difference in weight of the condensing apparatus, and the expense of these parts, which are not material in comparison with the additional power gained by the vacuum in condensing the steam. The additional simplicity of the parts of the high pressure engine is counterbalanced by the additional risk of leakage from the extreme pressure, the additional risk of accident from explosion, and as mason work is generally used in setting the boilers, the danger of fire from the furnace is greater with the high pressure engine.

The loss of power from the use of the air pump is far short of the gain from the vacuum produced; and, on the whole, for vessels, I should give the decided preference to the condensing engine over the high pressure, or non-condensing engine—in which opinion I am supported by a very large majority of the engineers of this section of the union, where the steam engine has been carried to higher perfection than in any part of the United States.

Form of boilers. The form of boilers in use for boat engines for wood or bituminous coal, most approved, is in the main similar to those in the "Fulton," with water bottom and flues connected with the furnace under the boiler; thence returning in small circular flues towards the front end of the boiler, where the several flues are brought into one chamber and thence carried into the chimney.

In the "Missouri" and "Mississippi" a second set of return flues above the first have been adopted, for the purpose of bringing the draft of the four boilers into one chimney.

The flue is surrounded where it leaves the boilers by a steam chimney, and the steam is brought into contact with the plates forming the bottom of the chimney, on the outside of which the flame acts after passing through the flues of the boiler; although there may be some trifling saving in fluel by heating the steam immediately before its entrance to the cylinder, the disadvantages in the steam chimney are such that I should hesitate to recommend its use for sea steamers. In the first place, the steam chimney is found to get out of order and require repair much sooner than any other part of the boiler, as the metal at the line of surface of the water, after a short time, corrodes, and requires replacing with new plates, which cannot well be done at sea.

The steam chimney is further objectionable in a war steamer, from its rising above the level of the boiler several feet, by which it is more exposed to the enemy's shot, and if penetrated by shot, the steam escaping from the orifice would endanger the lives of all on the gun deck; since the inhaling of the steam, by scalding the interior of the lungs, is sure to cause death.

The copper steam chimney used on board the "Fulton," I am informed, shows no symptoms of wear; still I am satisfied that this will be the first part of the boiler requiring repairs.

To obviate the frequent derangement of the steam chimney, what is called a steam chamber, raised above the boiler, has been substituted, and I think it preferable. Another plan however, has occurred to to me, and in conversation with Mr. Merrick, of Philadelphia, I learn that he has made a draft on the same principle, which is to carry the draft direct from the furnace into the upper tier of the flues, add to return downwards at a lower level by which means the draft will leave the boiler upwards of three feet lower than in the present form of boiler.

I have made inquiry from one of our most skillful ship builders in regard to the dimensions of steamers of 500, 600, and 700 tons burthen. The builders are Smith, Demon and Comstock. Smith, the engineer of the firm, who designs the models, was an apprentice of Eckford, and aided him in modeling the Ohio. The dimensions proposed by them are as follows, viz:

No. 1. 150 feet on deck.
27 feet wide.
15 feet deep. With double decks, custom house tonnage, 513 37-100 tons.

No. 2. 165 feet on deck.
28 feet wide.
15 feet deep. Double decked, tonnage, 611 5-100 tons.

No, 3. 180 feet on deck.
29 feet wide.
15 feet deep, Double decked, tonnage, 719 7-1000 tons.

They would build these vessels with bottom of white oak, and top of live oak and locust; copper fastened and solid floor, with suitable materials as to size and quality, say for hull and spars, including blockwork and outside joinerwork, at the rate of seventy-five dollars per ton. Sheathing copper and joiner's work below upper deck not included. For these vessels I should recommend a single inclined engine of the following dimensions, viz:

For No. 1, 513·37 tons burthen.
Cylinder 49 inches diameter, 8 feet stroke, 171 horse power.
For No. 2, 611·5 tons burthen.
Cylinder 54 inches diameter, 8 feet stroke, 204 horse power.
For No. 3, 719·7 tons burthen.
Cylinder 58 inches diameter, 8 feet stroke, 240 horse power.

The estimate of horse power is made on an effective pressure of 9·9 lbs. on the square inch of boiler, with a velocity of piston of 300 feet per minute for a water wheel of 20 feet in diameter, making 19 1-4 revolutions, allowing 1-3 slip or loss of speed between vessel and exterior of water wheel, will give a speed of nine miles per hour through the water nearly—which is ample for vessels of this size. I have not been able to form an estimate of the cost of these engines, which I presume will be supplied with iron boilers, but will be prepared

shortly in case the board desire that information.

As your letter invites me to touch on any other points which may occur to me, I would call your attention to iron steamers. For the lake service especially, they will be found far more durable, than vessels of wood, and for coasters they will be more durable, and with the water tight bulk heads, in case of getting on the rocks and bilging, they can readily be carried into port, and in dry dock repaired in a few hours at a trifling expense.

They have now been in use for several years on the Savannah river, and an annual coat of red lead is found to preserve them against rust.

Having built one steamer of iron for New Orleans at the West Point foundry association, we can safely say that the work can be done in this country as well as in England.

I regret that I did not meet Lieut. Hunter, when here in the "Germ;" but not having examined her machinery, shall not venture an opinion.

I have spun out my reply rather longer than originally intended, but have found this necessary to give you the practical explanation of the horse power, which appeared to me to be necessary to make the question understood by those not conversant with the subject; and if the subject be not sufficiently plainly stated, when we meet I think it can be made so by a few minutes' conversation.

I have omitted to speak of Capt. Ericsson's propeller, and also of Lieut. Hunter's wheels —your queries relating directly to the engines.

From the experiment, however, on board the "Clarion," of the effect of the propeller, in company with Capt. Perry and Mr. Rhodes I was satisfied that the effect produced by the quantity of fuel used, was fully equal to what would have resulted from the ordinary water wheel. Whether the same velocity given by the ordinary water wheel can be produced by increasing the power, I think doubtful; but it possesses the advantage of being submerged; and I think the trials have established the fact that with great economy of fuel, a speed of 7 knots per hour can be attained, and by increasing the power, have little doubt that 9 knots can be attained. I hope, therefore, to see one of the new steamers constructed with the propeller. Yours respectfully,

[Signed,] W. Kemble.

New York, 9th October, 1841.

To be continued.

Mathematics as a Branch of Professional Study.

(Continued from page 343.)

"The most fatal error which can be committed by a young professional student, is that any one kind of knowledge can be acquired without close and systematic application. If, too, there be one class which is less capable of being so acquired than an other, it is the mathematical. The length of time which a suitable professional course will require is quite another matter: but we must insist, as a primary condition, upon close and systematic study during the time that the subject requires. For those alone who are prepared to fulfil this condition do we offer our suggestions; and we should much regret if in any way we shall be found to have contributed to the formation of that most disgusting of professional characters—a compound of half-learning, self-conceit, and supercilious dogmatism.

"We hear so much every day respecting *taste* and *genius*—especially that mathematics inevitably tend to destroy the one and repress the other—that we cannot too earnestly warn the professional student against the influence of this kind of ignorant *cant*. Taste and genius are not familiar terms in the vocabulary of those few men who really possess them. Such men know too well how they cultivated the faculties which they possess, to feel justified in urging any young man to trust to his rude natural powers, however high their order may be. Why, we would ask, should the taste be depraved by a knowledge of the conditions within which the laws of nature *compel* all structures and machines to be limited? What is the use of fancies which can never be realized in construction? What is the value of those imagined forms which can only look well on *paper?* Possibly, however, the outcry against science will be in the main confined to those 'exhibitors' and 'candidates' whose highest ambition is to figure as the designers of something extravagantly original; and who have not the most distant expectation of being employed to build according to their own designs. It is strange to what expedients men will resort for 'obtaining a name;' and few modes are more common, we may say more vulgar, than to make a dash at reputation for taste and genius! Let such persons ponder well the following remark on the latter subject from one of the ablest men of our time—Professor Young, of Belfast:*

"'The great object of education is to originate an earnest desire after knowledge, and to foster the habit of private and solitary study. Without such a habit intellectual eminence can never be attained. It is in this that the true secret of what is called *genius* consists—a name that only serves to conceal from us the continuous effort—the untiring perseverance, and the days and nights of solitary labor, to which the attainment of excellence is always due.'

"Algebra and geometry, as sciences, are almost alike repulsive to the unpractised mind upon the first glance; although that repulsiveness in the two cases does not arise from precisely the same cause.

"In algebra, the chief difficulty is that of attaching general ideas to general symbols, whilst those symbols have already acquired different, and altogether dissimilar meaning in our estimation. There certainly is, when we carefully analyze the operations of our own minds, a very natural difficulty in attaching the idea of '*any* number' to a symbol, which in all our previous acquirements has been solely viewed as the visual representative, or symbol of *sound*. Yet it is, in fact, an effort of the mind not greater to conceive a number represented by a visual symbol, than a sound represented by it, or a thing represented by a sound. All the real difficulty arises from the previous appropriation of the symbol as that of a sound. Yet, on the other hand, numbers are familiarly represented by peculiar symbols in the ordinary notation, and even by letters in the Greek, Roman and other languages. The difficulty, then, will be probably transferred to the expression by means of a letter of any *arbitrary* number, so that in one research a letter may represent 5, in another 999, and in fact any number we please.

"It may assist the young algebraist to be impressed, *in initio*, with the conviction that algebra is but an application of the *rules* of arithmethical operation to those symbols of number taken as of *any actual values* whatever:—that the symbols $+$, $-$, $\times$, $\div$, $\surd$ *etc.*, designate *directions to perform* certain operations which they represent, according to the definitions given of them:—that in all, or in nearly all cases, the algebraic solution ends with a *direction to perform* the indicated arithmetical operations, when the specific numbers of a given problem are substituted for the literal symbols: and that, in fact, the literal symbols are only abbreviated expressions of the terms 'first number,' 'second number,' *etc.*, of any given arithmetical rule which applies to those numbers from the relations given in the particular question itself. To take a single instance, let us suppose a question in 'the rule of three' proposed, which, when stated according to rule was,

$$3 : 6 :: 9 : \text{answer}.$$

Then the rule itself for finding the answer is,

$$\text{answer} = \frac{6 \times 9}{3} = 18.$$

"Suppose now, that instead of the *given* numbers, 3, 6, 9, we had the general literal symbols, a, b, c, of any numbers whatever, and that x be put for the present unknown answer; then it would stand

$$a : b :: c : x, \text{ or}$$

$$x = \frac{bc}{a}.$$

"In this case, the value of an x can only be expressed in the form of indicated operations, and its *actual value* will depend upon those of a, b, c. This, then, is clearly, only a symbolical expression of the *rule* for finding the fourth term of a proportion, from having given the actual values of the first three.

"It is not, however, our object to write an elementary treatise on algebra, and we have only referred to it to point out what we conceive to be the real cause of the early repugnance of students to algebraic practice; and by showing its origin, to prove by how easy considerations it may be removed. We may further specially recommend to every young student the tract of Professor De Morgan, on *Algebraic Equations*, published by the Society for the Diffusion of Useful Knowledge. It is, in fact, a little work from which mathematical teachers themselves may derive much 'useful knowledge;' and to the private student, it will prove of the greatest advantage, in clearing up those elementary difficulties, which, by so often occurring, much retard his progress and diminish the pleasure and satisfaction of the study itself. He will, with this aid, very soon acquire a facility in the transformations, and clearness in comprehending

* Three Lectures on Some of the Advantages of Mathematical Study. Souter and Law, 1846.

the force of the symbols of the ordinary algebra. In conjunction with this, the student may read in the algebra of Professor Young, the '*Introduction* to the Elements of Algebra' by Mr. Hind, of Cambridge, or the algebra in the 12th edition of 'Hutton's Course.' In the last mentioned work there are several improvements in different operations, and in some parts of it a closer approximation traced between arithmetical and algebraical processes than we have noticed elsewhere; at the same time, we feel sorry to say, that we consider the editor not to have made the full use of his views of which they are capable. There is room for much improvement in this part of the work. May we hope for their full development in a future edition?

"With respect to algebraic problems, they are usually taken much more from combinations of general commercial transactions, or the affairs of common life, than from amongst the technical examples of the uses to which algebra may be professionally applied.—Writers on elementary science have less in view to serve the demands of particular classes, than to supply the wants of the general teacher. No publication, we should think, would undertake the risk attendant on an algebraic work, professedly and exclusively designed for the use of engineers and architects; although, doubtless, such a work may be composed by many mathematicians now living, had they adequate encouragement to proceed. Still, all such examples as may furnish exercise in the formation of equations expressive of given conditions, and the subsequent resolution of those equations, *do* answer a useful purpose—that of creating algebraic skill and power. One advantage, on the other hand, of a professional algebra, would be the fixing in the mind from their frequent occurrence certain *constants* that occur in the practice of these sister arts; whilst another would be, that greater facility of investigation in problems of the professional class would be given, than can be acquired by imaginary problems of merchandize, horses, wine, or dogs. We should think, indeed, that a course having a more direct professional bearing in this respect would be a desideratum with the professors of the College for Civil Engineers; and but for our knowledge of its former mismanagement, we should have certainly looked to it to furnish a model of such a 'Course' as seems to be naturally expected to emanate from a college instituted with such special objects as this is. We conceive, that whilst it would be thus conferring a boon on the profession, it would be materially serving its own pecuniary advantage, and still more materially contributing to its own reputation. We would earnestly direct the attention of its principal to this subject.

"It will be utterly useless for the student to proceed to the ulterior applications even to professional purposes, till he has acquired a *complete mastery* over the practice of the ordinary rules of operation and transformation. This is his first stage—which we consider to terminate with the resolution of quadratic equations—and which, once passed, algebra will cease to offer other than the most ordinary difficulties.

"Many subjects are discussed in our elementary works, upon which we would advise the professional student to bestow but little attention in the earlier stages of his reading; and in fact, not at all, till he finds that his pursuits make some demand upon them.—They can be easily acquired if found necessary; and till they are found so, all attention to them will retard his progress towards other topics which are most essential to him. Such, for instance, as continued fractions, progressions, quadratic surds, infinite series, the properties of numbers, etc.

"We would, however, strenuously urge the clear understanding and facile employment of the doctrine of intermediate coefficients as an object of the greatest importance. It is one of the most powerful instruments of research that we possess; and may, indeed, be considered the key of the higher mathematics. It immediately introduces us to the most simple proofs of the binomial theorem, the exponential theorem, the doctrine of logarithms, the expansion of trigonometrical functions, and even of the differential calculus. In point of fact, there is nothing to prevent our *immediately* entering upon the study of this last subject, when the use of intermediate co-efficients is once rendered familiar to us, except it be that some other of the subjects which are usually made to intervene in a mathematical course are also of greater importance to be studied early. Upon this, however, more hereafter.

"We can never too urgently warn the professional student to beware of a captious spirit, and of cavilling with the metaphysics of the algebraic system. What he cannot now see in this respect, he will understand hereafter, if he will steadily pursue the route through which he is led. Let him avoid the discussions which he may stumble upon, respecting symbolical and arithmetical algebra, the interpretations which some ingenious persons may have put upon $\sqrt{-1}$, apart from its being the expression of impossibility; and twenty others which may come before him. His business is with the ordinary processes of algebra, and with valid reasons for their adoption; and as a professional student, he has no other business with the subject, whatever, as a mere lover of speculation he might have had. On the other hand, we are far from recommending his acquiring a lax habit of reasoning, or taking any rule that may be propounded without reasonable and satisfactory evidence. As a habit it will be the most pernicious, the most fatal he could contract. It would, indeed, be scarcely better than the 'rule of thumb' practice that has done, and still does, almost invariably constitute science amongst engineers and architects.

"Having made these general remarks upon the study of elementary algebra, we shall in our next number proceed to suggest some considerations relative to geometry; after which, algebra and geometry in combination will receive due consideration."

Statistics of the Coal Trade of Schuylkill County.

In an article on the effect of the tariff upon the coal trade of Schuylkill county, the Miners' Journal gives an interesting statement of the amount and increase of this trade within a few years. The statistical tables we copy.

Capital invested in 81 miles of incorporated railroads	$1,000,000
50 do. of individual do	150,000
50 do. under ground do	60,000
1500 railroad cars	150,000
2400 drift cars	96,000
34 collieries below water level, with with steam engines, pumps, etc	850,000
100 collieries above water level	500,000
Landings	200,000
Boats and boat horses	500,000
Working capital	300,000
Schuylkill canal	5,000,900
Reading railroad, cars, engines, etc	10,250,000
Towns in the coal region	3,000,000
Danville and Pottsville railroad	800,000
80,000 acres coal land at $50 per acre	4,000,000
	$26,856,000
Estimated investment for same items in 1842	17,526,000
Increase in four years with protection	9,330,000
Tons of coal sent to market in 1845	1,131,724
Consumed in the region about	75,000
Total tons	1,206,724
Sent in 1841	620,345
Increase—almost doubled in 4 years	586,379

The population of the coal region of Schuylkill connty is now almost 25,000. There are also about 2000 horses used in the trade in the region.

Agricultural Products consumed in the Coal Region in 1845.

Wheat and flour	$187,000
Corn, rye and buckwheat	180,000
Oats	70,000
Hay	80,000
Straw	6,000
Beef and pork	260,000
Potatoes	30,000
Poultry	25,000
Butter	23,000
Lard	7,000
Milk	35,000
Eggs	8,000
Vegetables, apples, peaches, turnips, onions, etc	50,000
	$961,000
Consumption in 1841	580,000
Increase in 4 years	$373,000

Merchandize Consumed in 1845.

Groceries	$750,000
Dry goods—foreign and domestic	625,000
Boots and shoes	100,000
Drugs, glass, dye stuffs, etc	40,000
Hats and caps	40,000
Saddlery	15,000
Nails and spikes	20,000
Bar, pig and boiler iron	75,000
Railroad iron	50,000
Stone and hollow ware	10,000
Confectionery	15,000
Jewelry	8,000
Books, stationery and paper	10,000
	$1,758,000
Consumption in 1841	918,000
Increase in 4 years	$840,000

The quantity of oil included in groceries is a pretty considerable item. It is estimated that the quantity consumed in the region last year was worth at least *one hundred and sixty thousand dollars.*

Lumber.—The quantity of lumber used for buildings is very large in this region—and the value of the timber used in the mines for props, shutes, etc.,

will not fall short of *fifty thousand dollars per annum* and very probably exceed it.

Coal Rents.—The income received last year by the holders of coal lands, for coal land, did not fall short of *three hundred thousand dollars.* This is a large sum extracted from our mountains annually in the shape of rent.

The above estimates are based upon correct data, and will rather fall under than over-run the reality.

It is hardly necessary to add that the market, created in this region for the produce of the farmer has nearly doubled the value of farming lands in Schuylkill county, and has also increased the value of lands in the adjoining counties,

In 1837, the quantity of coal sent to market from Schuylkill county was—tons.....	540,000
In 1842, the trade had increased to only...	572,000

Increase in a period of six years only *thirty-two thousand tons.*

In 1845, the quantity sent to market from this county reached—tons.....	1,132,000
In 1841.....	572,000
Increase in only three years.....	560,000

Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

PRINCIPAL CONTENTS.

AMERICAN RAILROAD JOURNAL.

PUBLISHED BY D. K. MINOR, 23 Chambers street, N.Y.

Saturday, June 6, 1846.

Electro Magnetic Telegraph.

The use of this new and valuable invention is rapidly spreading over the English lines of railway, although the systems there employed are far inferior to that of Prof. Morse, which is the only one adopted in this country. Why is it that so few of the railroads in this country have availed themselves of the inestimable advantages of this telegraph—by means of which, intelligence may be conveyed to any station on a line, no matter how long, and at any moment of time.

To a railroad company, giving the use of their line for the erection of the telegraph, as a means of conveying general news, the expense would be trifling for such an increase of wires and apparatus as would insure the instantaneous communication of orders and messages from any one point to all others—an advantage hardly to be estimated in money.

Reading (Official) Railroad.

A comparative statement of the business on the Philadelphia and Reading railroad for the week ending—

	May 25th, 1844.	May 24th, 1845.	May 23d, 1846.
Travel.....	$1,702 79	$2,107 63	$3,147 69
Freight on goods.	761 07	1,237 09	3,169 53
Do. do. coal..	8,724 24	15,758 31	25,111 50
Miscell's receipts.	....	....	....
Transp. U.S. mail.	....	....	....
	$11,188 10	$19,103 03	$31,428 72
Coal trans., tons..	8,857	15,990	20,056

The subjoined table of the rates of transportation at present adopted for the above road, will be found of interest to all those engaged in the business now being passed over it.

Office of the Phila and Reading R. R. Co.
Philadelphia, May 20th, 1846.

Notice is hereby given that on and after June 15th next, the raits of freight and toll on coal transported by this company will be as follows:

From Mt. Carbon.	S. Haven.	Pt. Clinton.
To Philadelphia.....$1 70.....	$1 60.....	$1 45
Inclined plane.... 1 60.....	1 50.....	1 30
Richmond ..... 1 60.....	1 50.....	1 30
Nicetown..... 1 60.....	1 50.....	1 30
Germantown r.rd. 1 60.....	1 50.....	1 30
Falls of Schuylkill 1 45.....	1 35.....	1 20
Manayunk..... 1 35.....	1 25.....	1 15
Conshehocken .... 1 25.....	1 25.....	1 10
Turnout, 1 mile below Norristown. 1 20.....	1 20.....	1 10
Plymouth railroad. 1 20.....	1 20.....	1 10
Bridgeport or Norristown ..... 1 20.....	1 20.....	1 10
Port Kennedy.... 1 20.....	1 20.....	1 10
Valley Forge..... 1 20.....	1 20.....	1 10
Phœnixville..... 1 15.....	1 15.....	1 05
Royer's Ford..... 1 10.....	1 10.....	1 00
Pottstown..... 1 10.....	1 10.....	1 00
Douglassville ..... 1 10.....	1 10.....	1 00
Reading ..... 1 00.....	1 00.....	0 90
Mohrsville..... 0 80.....	0 80.....	0 70
Hamburg..... 0 60.....	0 60.....	0 50
Orwigsburg..... 0 50.....	0 50.....	0 50

By order of the Board of Managers,
S. BRADFORD, Sec'y and Treasurer.

Central Railroad, Michigan.

The receipts of this road for the month of April were, $25,720 27. For the corresponding month of 1845, the receipts were, $11,607 15.

The receipts for three months on this road show a larger increase than any other road in the United States, not excepting the Reading railroad.

	1845.	1846.
January.....	$6,412 83.....	$19,703 75
February.....	7,308 47.....	14,254 36
March.....	6,977 81.....	22,254 54
	$20,699,11.....	$56,212 65
		20,699 11
Increase.....		$35,513 54

The Detroit Advertiser says, this table shows in unerring figures, the onward march of our state, and the great value of its principal work. The increase in freight is really astonishing. The crop of 1844, it is true, partially failed; but this alone will not account for the amazing increase. When the road is rebuilt and relaid with heavy iron, the result will be still more surprizing and gratifying. And when it is completed through, and due measures taken to counteract the injurious policy of the steamboat combination, the fare from passengers will increase in equal proportion. We cannot believe that any light consideration will prevent the Boston corporators from accepting the purchase.

Comparative Cost of the Transportation of Coal on the Reading and on the English Railroads.

We have been furnished, at our special solicitation, by John Tucker, Esq., the able president of the Reading railroad company, with the following copy of a letter written by Edward Wood, Esq., engineer of the *Grand Junction Railway*, (England,) to Wm. Brown, Esq., of the house of Brown, Brothers & Co., of Liverpool, in relation to the accuracy of the statements of cost of transporting coal, as set forth in the last annual report of the Reading railroad company.

The letter of Mr. Wood, it will be perceived, fully sustains the statement of cost as made by the superintendent of transportation on the Reading road.

The letter is dated—

"GRAND JUNCTION RAILWAY,
Liverpool, 28th March, 1846.

WILLIAM BROWN, Esq.

Sir:—Our secretary, Mr. Booth, has handed to me the report of the directors of the Philadelphia and Reading railroad company, with the request that I would examine it and give my opinion how far the statements of the cost of transport is borne out by the experience of English railroads. I have carefully read the report and analyzed such of the calculations as bear upon the question, and I do not find them to differ to any material extent from the results of the experience of railways in this country. By the statement H, page 27, it appears that the cost of hauling coal for the year ending 30th November, 1845, has been 37 1-10 cents per ton per round trip of 186 miles, from the coal region to tide water, with an average load of 295 tons of coal, say 93 miles with loaded wagons and 93 miles with empty wagons. Abstracting the several amounts comprising the whole cost, and classifying them as we are accustomed in this country, we have the cost per ton per round trip, as follows:

1. Locomotive power, including assistance, etc., etc.....	25 7-10 cts.
2. Wagon disbursements.....	7 3-10 "
3. Conductors, brakesmen, lamps, porterage, etc.....	4 1-10 "
	37 1-10 "

To arrive at the cost of working a similar railway, with similar traffic, I assume what experience has shown me to be tolerably near the truth—that the cost of locomotive power, including depreciation of stock, would be about 18 pence, say 36 cents per mile run, with heavy loads; and that the cost of repairs of wagons, oiling, and depreciation, would be at least 10 per cent. on the value of the stock; then the cost of locomotive power per ton, per trip, is—

183 miles at 18 pence = £13 14s. 6d. ÷ 295 tons.
295 tons = 11 2-10 pence, say 22 1-2 cents.

And wagons, supposing a stock of 4,000 value at £60 each, £240,000. 10 per cent. on £240,000 is £24,000, which, divided by 1,200,000 tons, the annual traffic, gives 4 6-10 pence, say 9 1-4 cents per ton per trip.

Comparing these results with the recorded cost on the Philadelphia and Reading, we have—

For locomotive power.....	22 1-2 cts. ag't	25 7-10
And for wagon disbursements.	9 1-4 " "	7 3-10
	31 3-4 " "	33 cts

The expense of conductors, brakesmen, etc., would probably be very nearly the same in both cases.

The results are, perhaps, as near as can be expected under the difference of circumstances.

The expenses of repairs and maintaining the stock of wagons on the Philadelphia and Reading railway, certainly appears to me rather low; and I do not discover that any sum has been set aside to cover that portion of the depreciation which cannot be renewed by repairs.

When the improvements in the efficiency of the locomotices, adverted to in the report, have been carried out, I have no doubt the cost will be lessened.

I am, sir,
Your most ob't serv't,
(Signed,) EDWARD WOOD."

The Maryland Mining Company, and their Works.

The enterprize of the Maryland Mining company, in the bituminous coal region of Maryland, bids fair not only to attract much attention, but to exercise an important influence on the coal trade of our country. We notice in the Cumberland Civilian of the 15th inst., the announcement of the completion of the railroad, and works to bring this valuable fuel to market in the Atlantic cities; and we find names connected with this enterprize that insure its certain and early development.

The Maryland Mining company, we understand

possess a tract of about 2,300 acres of coal land in Allegany county, situated nine miles from the town of Cumberland. The stock of the company is principally owned by wealthy mercantile houses in this city, and its affairs are mainly under the control of Horatio Allen, Esq., as president—a man whose character is favorably known to the public, and who possesses, in an eminent degree, the requisites to manage so important an enterprize.

The coal from this region, by the analysis of eminent chemists, is shown to be, for many purposes, superior to any in this country. It possesses from 77 to 85 per cent. of pure carbon, from 12 to 15½ per cent. of bitumen, and only from 4½ to 6 per cent. of incombustible matter. It burns with a pure white flame, and almost entirely free from smoke and sulphurous gas. Practical use, we understand, has borne out this analysis. Those who have used this coal in the ocean steamers, as well as in manufactories, bear high testimony to its value.

The works now completed connect the mines with the Baltimore and Ohio railroad at Cumberland, and with the Chesapeake and Ohio canal—now in progress of completion from Alexandria to that place—and we may soon look for a large supply of this valuable article, equalling, if not surpassing in quality, the product of the best English mines, delivered in our city at prices greatly reduced below the rates charged for English coals.

The railroad of the Maryland Mining company is worthy of remark, and interesting in itself to engineers. Its grades are higher, if we recollect, than any hitherto worked in this country. The total elevation overcome from Cumberland to the mines, is 1,134 feet in 9½ miles—5 miles of which have a grade of 135 feet per mile, intended to be worked by the powerful 25-ton locomotives of the Baltimore and Ohio railroad. These engines are calculated to haul up to the mines a train of 25 iron cars, weighing 2½, and carrying 7 tons each. The superstructure is laid in a substantial manner, with a Z rail of 38 pounds per yard, according to the plan of B. H. Latrobe, engineer of the B. and O. road, of which a description was given in No. 6, vol. VI, new series of this journal. The iron rail is fitted to a string piece, its lower web projecting horizontally inside the track, supported every two feet by cross-ties; its upper table projects outwards and overlaps the string piece to which it is bolted by horizontal bolts ¾ inch diameter, fastened by a nut and screw on the outer side, which adjusts the rail at all times to its side support of timber. This combination, it is said, accomplishes two desirable results, viz: guarding the rail from a downward or longitudinal movement, and at the same time protecting it in the most perfect manner from the side lurching of the engine and train, a force causing a deflection double that of the direct pressure. In height, the stem of the rail is 4½ inches from the cross-ties, on which it rests, to the upper surface, and the thickness of the stem is ¾ of an inch. This form of rail has not yet been fairly tested, but we have much confidence in its success. The passage of the engine and cars over it is said to be smooth, having none of the unpleasant jarring at the joints common to most other descriptions of heavy bar. This results from the bolts passing through the bar near the joints, each bar being secured at its terminus, thus securing an *even joint*.—When a track becomes deranged by the settlement of embankments, common on new works, it will not become disjointed, or disconnected, but goes down uniformly, and may be again readily adjusted to the grade line without any separation of its parts.

Should this experiment prove as successful as, we understand, the present trial gives fair promise, a material saving will be effected both in iron and cost of construction, by the use of the Z, instead of the H, or bridge, rails. Tracks laid in this manner afford a resistance, with a 38-lb. bar, equivalent to a 50-lb. bar of the usual H form. The cost of superstructure, other circumstances being equal, will, it is said, be reduced about $1,200 per mile.

The Z rail used on this work was manufactured during the last year at the Mount Savage iron works, located on "Jennor's run," within three or four miles of the mines of the Maryland Mining company.

Should the Chesapeake and Ohio canal be completed to Cumberland, as it surely will and should be, the coal of this region will possess an ample outlet to the seaboard. The Baltimore and Ohio railr'd co. has contracted with the Maryland Mining company to deliver from 30,000 to 50,000 tons per annum in Baltimore, working the road of the latter company from the mines. We are gratified to learn that a combination of interests is likely soon to be brought to bear to insure the speedy completion of the canal to Cumberland—forty-two miles of which are in an unfinished state, and the estimated amount required is so inconsiderable, in comparison with the important results to accrue to the iron and mining interests, that much longer delay cannot possibly exist.

We copy the following account of an excursion to the mines, by way of celebrating the event of the completion of the road, from the Civilian. The editor says:

"At ¼ before 10 o'clock, the president Horatio Allen, Esq., of New York—the engineer, Col. M. O. Davidson—the contractors who did the work—several of the stockholders and directors of the company, with a number of gentlemen who attended by invitation—in all about fifty—left Cumberland depot for the mines. The car in which they took passage was drawn by the engine J. Quincy Adams, which, although it is old and has seen much service, still has, like him whose name it bears, an abundance of steam power. After several times stopping on the way to examine the work over which we passed we were brought up at our destination, safe and in good spirits, about 12 o'clock.

"The road is, in our judgment, and in this we speak the opinion of gentlemen of great practical experience, well built and admirably adapted to the purpose for which it is intended—the transportation of coal. It is strong in all its parts, and bids fair to be as durable. The track is laid with the Z rail, weighing 38 lbs. to the yard, which is said to be one of the very best rails in use. The construction of this work was no small undertaking. For the length of it—it is nine miles and a half—it is one of the heaviest works we have ever examined. Its route is directly through the 'Narrows,' all the way in view of the National road, and through a country abounding in the most bewitching scenery. It combines whatever is grand and picturesque in nature, and extravagant as are the praises bestowed on the wild mountain scenery about Harpers' Ferry, we do not think it is comparable to this. Your true worshipper of nature might look upon it for days, and still discover new beauties on which to feast the unwearied vision. If any one doubts us, let him pass through the 'Narrows' and catch, as we did, one long, lingering sight of Wills' mountain, with its tall cliffs, hoary and weather-beaten, yet erect and majestic. The very rocks are eloquent of Omnipotence, and in the pride of conscious power, they seem to mock in fantastic imagery, the ruined and antiquated castles of other days—

"'Whose rocky summits, split and rent,
Form'd turret, dome and battlement.'

"About two miles from Cumberland, Wills' creek is crossed by a bridge, which deserves a passing notice. It is two hundred feet long, and has three arches of 45 feet span each, suported by stone piers and abutments. The superstructure is of brick masonry. It is, exactly what we should call a capital bridge and furnishes the very best evidence of the skill and fitness of the engineer, Col. Davidson, under whose direction the work has been done. As to its strength, the freshet of Saturday last, which brought the water up two feet higher than the springing line of the arches, has fully and satisfactorily tested it. It cost $6,500, a sum so low that we would have supposed it impossible, had we not the best authority for our statement.

"There are two tunnels, which have no other walls and arching than the rude rock through which they are cut—one 540 feet and the other 360 feet from point to point.—There are also six deep cuts through the hardest rock, varying from 20 to 50 feet each, besides several heavy embankments. The elevation at the mines is 1,134 feet above the grade at Cumberland, and five miles of the road is made to the enormous grade of *one hundred and thirty-five feet* to the mile. It was commenced on the 10th of April, 1845, and notwithstanding these formidable difficulties, which appear almost insurmountable to the inexperienced and unskillful, the *whole* work except the putting down of three miles of the track, was ready for use before winter, which of course suspended all operations.—This spring, again, it was thrown back by land slides, the consequence of frequent and heavy rains, else it would have been entirely completed a month or two earlier. Such energy and perseverance are so rare—therefore the more honorable—that we should manifest a great contempt for merit, did we not give all praise to the contractors, Messrs. Gonder, Hazlehurst & Co. They have been indefatigable, and *their work* is of itself the highest tribute to their capacity, it gives them all the certificate they need. We were happy to be informed by the president, that these gentlemen are owners of one-fifth of the stock of the company.

"But if we were pleased with our trip over the road, we found new pleasures in visiting the mines, through which, torch in hand, we sped our way, examining and admiring as we went. The grand entrance to these is by an archway of stone masonry, with a girt of 15 feet. From this, two galleries make a straight passage for a distance of 700 feet, a track being laid in each. The track in the upper gallery is for bringing out the loaded cars, whilst that in the

lower is used when they return empty. Besides these galleries, there are ten smaller ones, to be enlarged as necessity may require, making into them; the bed of each a little more elevated than the other, as they run in succession, with a view to a perfect drainage of the mines, to which the lower of the two main galleries, already mentioned, acts as the drain and keeps them always dry. The coal, of which the veins are ten feet in thickness, is of superior quality and quite free from slate and sulphur. One miner will, we understand, get out five tons a day, and with fifty —the number the company will have in their employ—*two hundred and fifty tons* will be the daily product. The mines and the road together cost about $260,000; and the cost of the road alone was not less than $175,000.

"The thing of greatest interest here, however, was the opening of a very pretty room, about sixteen feet square, with its walls and ceiling, and floor, all of virgin coal, which, in honor of the mines, was called the *Eckhart saloon.* Hore was a sight most refreshing to hungry men. Two tables were spread, well supplied with the finest mutton and ham, flanked by all the necessary 'trimmings.' On these the work of destruction was soon begun, and the ladies (we beg their pardon most humbly for not mentioning them before) and gentlemen of the party were much pleased with the entertainment. Its novelty certainly helped the appetite, for some of us evinced quite as much love for 'the provaunt' as ever did Dugald Dalgetty, and he was by no means slow.

"We left the mines a little after 3 o'clock in the afternoon, and were in Cumberland again in less than 50 minutes, although our friend Slack, who had the honor of conducting the first car over the road, did n't make the engine keep up her 'best licks.'"

Speculation in England.

The number of joint stock companies registered in 1845 was 1,520, being for all conceivable objects, even the most absurd—so that the spirit of speculation and not the railway system must bear the blame.

☞ From the extracts which we give from the St. Louis New Era, it would seem that, much as railroads are thought of and desired, there is yet something not quite friendly to them in the policy of "the political wiseacres of Missouri."

"The charter for a railroad from Richmond to the Ohio river is very liberal. It permits the company to select its own route, authorizes the subscription of a capital of twelve millions of dollars, two millions of which may be invested in lands, mills and machinery. It permits the company to make the point of termination at any point below the mouth of the Great Kenawha. In the Old Dominion they do not seem to be so much afraid of useful corporations as are the political wiseacres of Missouri."

In New England they are pushing forward various lines of railroad with a degree of liberality, industry and enterprize that is truly admirable. If railroads are profitable over the broken hills and sterile soil of New England, will they not richly repay for the investment when they shall be constructed over the level praries and exuberant soil of the west? We anticipate the time when our state will be intersected by a number of most valuable railroads, unless it shall be deprived of such advantages by a blind and suicidal course of policy."

"The most profitable railroad in the United States will probably be one extending from St. Louis eastwardly through the central portions of Illinois, Indiana and Ohio, with branches reaching to Cincinnati, Parkersburg, Pittsburg; Cleveland and Erie, and connecting with roads leading into all the Atlantic states. This great line of road will be profitable because it passes over a country free from mountains, and in which the construction of a railroad will be easy, and cheap; its entire line will be through an exceedingly fertile and productive country; the right of way will cost very little, and it will form a connection between the great river of the west, the great lakes of the north, and lines of railroad extending to every Atlantic port. It is manifest that this road will be exceedingly profitable. A stream of trade and travel will come westward. A railroad from Virginia will strike the Ohio below the mouth of the Great Kanawha; the Baltimore and Erie, and Pennsylvania railroads will bring great currents of trade from Baltimore, Philadelphia and New York, and all these lines will connect with the Central Western railroad and send a large trade toward St. Louis. The country interested ought to begin to take measures to secure the construction of this line."

"A railroad has been surveyed from Mobile to Pascagoula, forty miles, on a direct route to New Orleans. They are constructing a railway from New Orleans to Cat Island, distant 35 miles by water from Pascagoula. These railways, if completed, would bring New Orleans and Mobile within five hours travel of each other."

War and Railroads.

The present excitement consequent upon the declaration of the president that we are in "a state of war with Mexico," and upon the recent news from the Rio Grande, has drawn men's minds from all other topics. We desire, however, to "improve the occasion," by a word or two in favor of railroads. The defenceless condition of some of our seaports is well known, and not without reason have some apprehended a sudden attack from war steamers, even upon the city of New York.

It is worth while remembering that no city could long remain defenceless whose communication with the interior was secured by numerous lines of railroad. Before many shots could be fired at the city of Boston, an innumerable force could be gathered from every direction. But what communication has the great city of New York with the interior in winter time? The Hudson river closed, upon what defence, except that of the inhabitants themselves, could we depend? and among our floating population, how large a proportion would be ready to play into the hands of our enemy?

The military value of railways is attracting the attention of all the European powers, and as we have declared ourselves, *the* great American power —as we have through our rulers thrown down the gauntlet to all the world—would it not be worth our while to think of *all* the means useful to us in the extremities to which we may be driven?

The remarks of Sir John Burgoyne, in the following extract from the Railway Express—although intended for England, and its relations to France—are in no wise inapplicable to our own country.

"*Railways vs. the Prince de Joinville.*—I look upon the whole safety of the kingdom to depend upon railways. Looking at the facility there is now for making incursions upon the coast, with large bodies of men, such as the French have, nothing but the power of concentration which the railways would give you could enable you to risk successfully, and I think you will thus be able successfully to counteract, with the aid of a few other means, the apprehension from invasion from the power of steam vessels. I quite understand Sir Willoughby Gordon's reasoning about the difference between the present and former times. Formerly, the apprehension was always upon the south coast of England, and it was very necessary to have the troops stationed there, so that they could be within reach of every part by the then mode of communication, which was by ordinary marching, therefore you could not afford to have them above three or four days' distance, but now you would have your troops 200 miles in the north, and you could bring them down within 24 or 48 hours to any part where there was a threatening: giving you that power, the great advantage of which is well known in military tactics—the power of concentrating upon any given point in a short time. *For you could concentrate all the forces of England before the enemy could go through the operation of actually landing twenty thousand men!* For we know that the operation of landing a large body of men under every advantage which the British navy afforded us was very serious—it took days and weeks to effect it, with all the equipments. I do not believe any other power is at all aware as we are of the difficulty of landing troops, because we have tried it over and over again, which they never did, and we have found by experience that it is attended with very great difficulty, and takes a very long time. The whole question of war depends upon the general who can concentrate his troops with the greatest rapidity, and in the greatest numbers, upon a given point of importance; and if you carry down your men from the north faster than the enemy can land them upon the coast, you have every advantage."—*Sir John Burgoyne.*

Atmospheric Railways in France.—It is most probable that the French atmospheric lines will be constructed after the system of Mr. Mallette, at Arras. According to the report of Mr. Seguler, read at one of the last meetings of the institute, it is, besides some other advantages, the method of closing the tube, proposed by Mr. Mallette, which deserves commendation. The closing, namely, of the tube whence the air has been extracted, is *not* done (as chiefly proposed in England) by greased valves, but by smaller tubes of caoutchouc adequately inflated. These lie on both sides of the fissure of the main tube, and their inner segments close towards each other, which is effected by the air (both the outward, as that contained in them) pressing on the *vacuum* of the main tube. Mr. S. says, that to become convinced of that state, he had water thrown on the India rubber tubes, which, however, remained on them, without, in the least, penetrating into the main tube. As, however, the content of air in the smaller tubes, is to be a *constant* one, every guard is to be provided with a small hand pump, by which he can introduce the necessary quantity of air into the elastic tubes, which is indicated by a manometer placed in the inside.—*The Builder.*

The Law of Railways.—The beautiful uncertainty of the law was never better illustrated than by the delicious ambiguity that prevails with reference to actions on the subject of railway liabilities. Every case that comes before a jury, if the defendant is charged with any liability on account of any railway, is sure to terminate in a verdict for the plaintiff. A provisional committeeman can recover a deposit from an allottee to-day, and an allottee may recover it back again from the provisional committeeman to-morrow. The judges seem to have adopted the old court of requests principle of "how will you pay it?" in reference to all claims made upon any person in respect to any railway. Every one is declared to be

liable to every one else; but it seems to be at the same time, perfectly understood that every verdict will be set aside, as a matter of course no matter which way it happens to be, or what principle it proceeds upon. Any one may have a verdict to any amount, upon any ground whatever, provided his demand arises out of something connected with a railway. The lawyers have hitherto been the persons to profit by railway speculation, and it seems they are likely to continue so; for while verdicts are being allotted to all who take the trouble to ask for them at the hands of a jury there will naturally be a strong and general desire to litigate.—*Punch.*

Patent Rotary Fire Engine.

Is not the following a mere copy of a pump once much used and approved in this country, under the name, we think, of "Cooper's rotary pump?" If any of our readers can answer the question, and tell us what has become of what seemed to be a cheap and useful article, we shall feel obliged.

"The Midland Counties Herald gives an account of a trial lately made at Birmingham of a new fire engine, invented by a Mr. Farmer. Three engines of different sizes, manufactured for exportation, were tried. The largest threw a perfectly compact stream of water, half an inch in diameter, to a height of upwards of sixty feet; and by substituting a rose for the jet, covered an area of nearly forty feet diameter. Another of the engines was constructed so as, if required, to act as a pump, for the purpose of supplying water to the largest engine, or for any other purpose. The principle in all these cases is that of the action of the wheel within a circular chamber, with which the pipe leading to the cistern and one end of the hose communicate. Attached to the wheel are slots which close the apertures of each of those pipes at the same time. Let the wheel be turned as it may, one-half of the chamber is *in vacuo*, and thus the loss of the up-stroke in the ordinary construction of the pump is avoided, and the machine, by one revolution, throws out the water through the jet, and draws it up from the cistern. The application of the multiplying power of cog-wheels produces five revolutions of the central wheel for one turn of the winch, thus of course rendering the working of it so much easier. The trial have great satisfaction, it being evident that tge rotary engine was much more effective and certain in its operation than the ordinary fire engine."

Lexington and Ohio Railroad.

The late movement of the legislature in withholding from the citizens of Kentucky the *privilege* of making railways at their own *expense* seems to have excited some surprize to the eastward, as the following extract of a letter from a gentleman in New York to his friend in this city shows:

"I regret to learn that Kentucky is so backward in undertaking, or *allowing* the construction of railroads. It only shows how difficult it is to eradicate error and inculcate truth," etc. "It is surprizing to me that the legislature of Kentucky could have been induced to do so foolish an act as to reject a bill *allowing* her citizens to invest their money in a way from which so much good would arise."

It would be unfair to judge of the action of the legislature without explanation. The state has expended $1,000,000 nearly in constructing five dams on the Kentucky river, and she has a right to expect some revenue from that expenditure. The railroads to Louisville and Cincinnati, from Lexington, were received as antagonists or rivals to the slack water improvement—and this supposition, it is believed, was the ruling cause of the defeat of the *railroad bills.* There was not an individual who voted for the road bills, who was opposed to the extension of slack water to the points originally contemplated, on the Barren, Kentucky and Licking rivers, to wit: the coal and iron regions.

And here let us ask, if 10,000 tons of freight and 15,000 passengers, to and from Lexington, is all that is to feed slack water for all time to come? Is the improvement to stop at the head of pool No. 5? Were the people not promised a navigation to Three Forks in 1835? That our coal, iron and lumber should be reduced in price? Stop at No. 5, indeed! What a *lame and impotent conclusion* to a great enterprize! Of what use is No. 5 or No. anything else, as it now is, to the raftsman or flatboatman, who wants to run his craft from above slack water to the Ohio? It is an obstruction and a tax on the highway nature has made for him. The slack water *must* go to the mountains, for until that goal is attained, *nothing is done.*—Short of this will be an injustice, a deception, and a humbug to the mountain interest, which has an equal claim to the fostering care of the commonwealth. The coal fields of Pennsylvania send yearly to market rising 2,000,000 tons of coal, which is more than 66,000,000 bushels of coal as measured here. Our coal field can send off more than that yearly, and not see that anything has been taken away. When to this is added the iron, which is always found in the coal measures, lumber, and general traffic incident to a great business, there is a mass of business presented worthy of the attention and enterprize of the commonwealth. It is manifest that the mere local trade of Lexington can be but a drop in the bucket compared with this. Also it is an erroneous opinion that the railways can ever compete to an injurious extent with the slack water navigations, for the line to Louisville will intersect the Kentucky river almost at right angles, and that to Cincinnati will not touch it, and scarcely touch the Licking. These lines will also penetrate regions of country now nearly or quite destitute of the benefits of the public improvements. The people on these lines do not ask the state to make the works. They are taxed to pay for the works from which they derive no advantage. They are willing to pay the state what the railroad has cost her as a purchaser.—They do not envy their fellow citizens the great advantage they derive from the public works, but are willing that the purchase money for the old railroad shall be applied to the building of more locks and dams. To present the case in a manifest view, suppose the people of Henry, Shelby, Oldham, and Jefferson should apply for privilege to build a railroad at their own cost to Louisville, would it not be a clear injustice to refuse them the right? Or suppose the people of Campbell, Kenton, Grant, Pendleton, Harrison and Scott should apply for the same privilege to Covington, upon what sound principle of justice or expediency could the application be refused?

The city of Louisville, which is justly the pride of our state, has expended $200,000 in the extension of the railroad from Frankfort; this and other capital has for the last 9 years laid buried in excavations and embankments. The total amount so expended and so long useless is not much short af $300,000. In the opinions and estimates above given, we are confident that we are right, but if wrong we will cheerfully admit it. We therefore invite investigation from all our contemporaries as to the following positions:

1st. That an adoption of a system of railways, to be executed by private enterprize, will be highly advantageous to the citizens of the state.

2d. That the roads from Lexington to Louisville, Maysville and Covington cannot be of detriment to the state works, if these works are carried as they should be, and were promised to be carried, to the coal measures.

3d. That the building of these roads will give to a numerous and industrious population the advantage of public and cheap conveyance, which is now destitute of such advantage—that such population is now paying tax for the maintenance of works from which they derive no benefit.

4th. That railroads are in an eminent degree beneficial to all the "*industrial interests*" of a community—to the farmer, to the mechanic, to the manufacturer, and to the merchant—to the capitalist they are a safe and steady investment.

5th. That they will increase production of home products, and its correlative consumption of foreign products, and add to the population, wealth, strength, and renown of the commonwealth.—*Lexington Observer.*

STEPHENS' RULING AND MECHANICAL Drawing Ink, for Engineers, Artists and Designers. This article will be found superior to the best Indian Ink for the above purposes. It does not smear with India rubber or wash off with water. It flows freely from the drawing pen, and never corrodes or encrusts it. It may be used on a plate or slab, with a camel's hair brush, diluting it with water, or thickening it by drying, as required. It has the advantage of being ready for immediate use.

Sold in conical-shaped bottles, convenient for using from, without any stand, at 15 cents each.

ALSO,

STEPHEN'S WRITING FLUIDS.

These compositions, which have so remarkably extended the use of the STEEL PEN, are brought to great perfection, being more easy to write with, more durable, and in every respect preferable to the ordinary ink. In warm climates they have become essential.

They consist of a Blue Fluid, changing into an intense Black color.

A Patent Unchangeable Blue Fluid, remaining a deep Blue color.

A Superior Blue Ink of the common character, but more fluid,

A brilliant Carmine Red, for Contrast Writing.

A Carbonaceous Record Ink, which writes instantly black, and being proof against Chemical Agents, is most valuable in the prevention of frauds.

Also, a new kind of MARKING INK for Linen and Inkstands adapted for preserving Ink from evaporation and dust.

Sold in Bottles of various sizes, by all Stationers and Booksellers.

Be sure to ask for Stephens' Writing Fluid.

N. B.—These unchangeable Blue Fluids are Patent Articles; the public are therefore cautioned against imitations, which are infringements, to sell or use which is illegal.

Stephens' Select Steel Pens.

The utmost possible care having been bestowed upon the manufacture of these articles, so as to procure the highest finish, they can be confidently recommended, both for flexibility and durability.

All the above articles are prepared by *Henry Stephens*, the inventor, No. 54 Stamford-street, Blackfriars road, London, and sold by Booksellers and Stationers in bottles of various sizes, and may be had wholesale from the agents in Boston, New York, Philadelphia, Baltimore, Washington, Charleston, New Orleans, and St. Louis.

Wm. W. Rose, Wall-street, New York, is my general agent in the United States.

VALUABLE PROPERTY ON THE MILL Dam For Sale. A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 fe. with lathes, work benches,

Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry, at end of main brick building, 60x45½ feet two stories high, with a shed part 45½x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side of Parker st., containing 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

Blacksmith shop, 49 feet long by 20 feet wide

For terms, apply to HENRY ANDREWS, 48 State st., or to CURTIS, LEAVENS & CO., 106 State st., Boston, or to A. & G. RALSTON & Co., Philadelphia. ja45

RICH & CO'S IMPROVED PATENT SALAMANDER SAFES.

Warranted free from dampness, as well as fire and thief proof.

Particular attention is invited to the following certificates, which speak for themselves:

TEST No. 10.

Certificate from Mr. Silas C. Field, of Vicksburgh, Mississippi.

On the morning of the 14th ult., the store owned and occupied by me in this city, was, with its contents, entirely consumed by fire. My stock of goods consisted of oil, rosin, lard, pork, sugar, molasses, liquors, and other articles of a combustible nature, in the midst of which was one of Rich's Improved Patent Salamander Safes, which I purchased last October of Mr. Isaac Bridge, New Orleans, and which contained my books and papers. This safe was red hot, and did not cool sufficiently to be opened until 16 hours after it was taken from the ruins. At the expiration of that time it was unlocked, when its contents proved to be entirely uninjured, and not even discolored. I deem this test sufficient to show that the high reputation enjoyed by Rich's Safes is well merited. S. C. FIELD.

Vicksburgh, Miss., March 9th, 1846.

Certificate from Judge Battaile, of Benton, Mississippi.

In October last I purchased one of Rich's Improved Salamander Safes, which was in the fire at the burning of my law office, and several adjoining buildings in this place, on the 17th of November last, at about half-past one o'clock A. M. of that day. The building was entirely consumed; and I take pleasure in stating that my papers in said safe were preserved without injury. A receipt book which was in said safe, had the glue drawn out of its leather back by the heat, and the back broken; but the leaves of the book, and the writing thereon, were entirely uninjured; and some of the writing which was of blue ink, was also left wholly uneffaced and not in the least faded. Said safe was by the fire heated perfectly red hot, and I do not hesitate to say, that said safe is a perfect security against fire. But the safe tumbled over during the fire, and being heated red hot, the outer sheeting of the door became pressed in, and the bolts of the lock bent, so that it could not be unlocked, and I had to have it broken open. JOHN BATTAILE.

Benton, Miss., December 27,1845.

Still other Tests in the Great Fire of July 19, 1845.

The undersigned purchased of A. S. Martin, No. 138½ Water street, one of Rich's Improved Patent Salamander Safes, which was in our store, No. 54 Exchange place. The store was entirely consumed in the great conflagration on the morning of the 19th inst. The safe was taken from the ruins 52 hours after, and on opening it, the books and papers were found entirely uninjured by fire, and only slightly wet—the leather on some of the books was parched by the extreme heat. (Signed,)

RICHARDS & CRONKHITE.

New York, 21st July, 1845.

One of Rich's Improved Salamander Safes, which I purchased on the 2d of June last of A. S. Marvin, 138½ Water street, agent for the manufacturer, was exposed to the most intense heat during the late dreadful conflagration. The store which I occupied, No. 46 Broad street, was entirely consumed; the safe fell from the 2d story, about 15 feet, into the cellar, and remained there 14 hours, and when found, I am told, and from its appearance afterwards, should judge that it had been heated to a red heat. On opening it, the books and papers were found not to have been touched by fire. I deem this ordeal sufficient to confirm fully the reputation that Rich's safe has already obtained for preserving its contents against all hazards. (Signed,)

WM. BLOODGOOD.

New York, 21st July, 1845.

The above safes are finished in the neatest manner, and can be made to order at short notice, of any size and pattern, and fitted to contain plate, jewelry, etc. Prices from $50 to $500 each. For sale by

A. S. MARVIN, General Agent,
138½ Water st., N. Y.

Also by Isaac Bridge, 76 Magazine street, New Orleans.

Also by Lewis M. Hatch, 120 Meeting street, Charleston, S. C. 16 tf

THE WESTERN AND ATLANTIC Railroad.—This Road is now in operation to Oothcaloga, a distance of 80 miles, and connects daily (Sundays excepted) with the Georgia Railroad.

From Kingston, on this road, there is a tri-weekly line of stages, which leave on the arrival of the cars on Tuesday, Thursday and Saturday, for Warrenton, Huntsville, Decatur and Tuscumbia, Alabama, and Memphis, Tennessee.

On the same days, the stages leave Oothcaloga for Chattanooga, Jasper, Murfreesborough, Knoxville and Nashville, Tennessee.

This is the most expeditious route from the east to any of these places.

CHAS. F. M. GARNETT,
Chief Engineer.

Atlanta, Georgia, April 16th, 1846. 17

TO LOCOMOTIVE AND MARINE ENgine Boiler Builders. Pascal Iron Works, Philadelphia. Welded Wrought Iron Flues, suitable for Locomotives, Marine and other Steam Engine Boilers, from 2 to 5 inches in diameter. Also, Pipes for Gas, Steam and other purposes; extra strong Tube for Hydraulic Presses; Hollow Pistons for Pumps of Steam Engines, etc. Manufactured and for sale by

MORRIS TASKER & MORRIS,
Warehouse S. E. corner 3d and Walnut Sts., Philadelphia 1t

LAWRENCE'S ROSENDALE HYDRAulic Cement. This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Flooms and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight papered barrels, by JOHN W. LAWRENCE,
142 Front street, New York.

☞ Orders for the above will be received and promptly attended to at this office. 32 1y

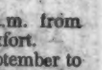
A. & G. RALSTON & CO., NO. 4 South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad Iron, viz:
180 tons 2½ x ½ inch Flat Punched Rails, 20 ft. long.
25 " 2½ x ½ " Flange Iron Rails.
75 " 1 x ½ " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 1tf

SPRING STEEL FOR LOCOMOTIVES, Tenders and Cars. The Subscriber is engaged in manufacturing Spring Steel from 1½ to 6 inches in width, and of any thickness required: large quantities are yearly furnished for railroad purposes, and wherever used, its quality has been approved of. The establishment being large, can execute orders with great promptitude, at reasonable prices, and the quality warranted. Address

JOAN F. WINSLOW, *Agent,*
Albany Iron and Nail Works,

LEXINGTON AND OHIO RAILROAD. Trains leave Lexington for Frankfort daily, at 5 o'clock a.m., and 2 p.m.



Trains leave Frankfort for Lexington daily, at 8 o'clock a.m. and 2 p.m. Distance, 28 miles. Fare $1·25.

On Sunday but one train, 5 o'clock a.m. from Lexington, and 2 o'clock p.m. from Frankfort.

The winter arrangement (after 15th September to 15th March) is 6 o'clock a.m. from Lexington, and ma. 9. from Frankfort, other hours as above. 351y

RAILROAD IRON—1700 TONS VERY Best English Rails, ready to be delivered.—These Rails weigh 60 lbs., the lineal Yard, are 3½ inches deep; 4 inches deep at base; 2½ inches wide at top; 17½ feet long, except one-tenth of 15 and 12½ feet in length.

A first rate Steam Pile Driver built by "*Dunham & Co.*," has never been in use, is in perfect order, and for sale a bargain; also 12 Railway Passenger Cars that have never been used, which will be sold very low. DAVIS, BROOKS & CO.,
June 1. 30 Wall Street.

BOSTON AND ALBANY.—WESTERN RAILROAD.—Fare Reduced.

1846. . Spring Arrangement. . 1846

Commencing April 1st.

Passenger trains leave daily, Sundays excepted—

Boston	7½ p. m. and	4 p. m.	for Albany.
Albany	6½ " and	2½ "	for Boston.
Springfield	7 " and	1 "	for Albany.
Springfield	7 " and	1½ "	for Boston.

Boston, Albany and Troy:

Leave Boston at 7½ a. m., arrive at Springfield at 12 m., dine, leave at 1 p. m., and reach Albany at 6½ p. m.

Leave Boston at 4 p. m., arrive at Springfield at 8 p. m., lodge, leave next morning at 7, and arrive at Albany at 12½ m.

Leave Albany at 6½ a. m., arrive at Springfield at ½ m., dine, leave at 1½ p. m., and arrive at Boston 6½ p. m.

Leave Albany at 2½ p. m., arrive at Springfield at 8½ p. m., lodge, leave next morning at 7, and arrive at Boston at 12 m.

The trains of the Troy and Greenbush railroad connect with all the above trains at Greenbush.

Fare from Boston to Albany, $5; fare from Springfield to Boston or Albany, $2 75.

Boston and New York, via Springfield: Passengers leaving Boston at 4 p. m., arrive in Springfield at 8 p. m., proceed directly to Hartford and New Haven, and thence by steamers to New York, arriving at 5 o'clock a. m.

For Buffalo: the trains for Buffalo leave Albany at 7½ a. m. and 7 p. m., arriving at Buffalo at 8 a. m. and 8 p. m. next day. Returning, arrive at Albany at 4 a. m. and 4 p. m.

New York and Boston, via Albany: the trains from Boston arrive at Albany in season for the 7 o'clock boats to New York. Returning, the boats, leaving New York at 5 and 7 p. m., reach Albany at 5 a. m., in ample season for the morning trains to Boston.—Steamboats also leave Albany at 7 a. m. and 5 p. m. and stop at the usual landing landing pirces upon the river.

The trains of the Springfield, Hartford and New Haven railroad, connect at Springfield, and passengers from Albany or Boston proceed directly on to Hartford and New Haven.

Montreal: through tickets to Montreal may be obtained in Boston, by which passengers may proceed to Troy, and thence by stage via Chester, Elizabeth, etc., and in the season of navigation by canal to Whitehall, and thence by the splendid steamers of Lake Champlain to St. John, via Burlington, and thence by railroad and steamers to Montreal.

The trains of the Hudson and Berkshire railroad connect at Chatham and State Line.

The Housatonic railroad connects at State Line.

The trains of the Connecticut River railroad connect at Springfield, and passengers may proceed without delay to Northampton, and thence by stage to Greenfield, Brattleboro, Bellows Falls, Hanover, Haverhill, etc.

Stages leave West Brookfield for Ware, Endfield, New Baintree and Hardwick; also leave Palmer, for Three Rivers, Belchertown, Amherst, Ware and Monson; Pittsfield for North and South Adams, Williamstown, Lebanon Springs, etc.

Merchandize trains run daily (Sundays excepted) between Boston, Albany, Troy, Hudson, Northampton, Hartford, etc.

For further information apply to C. A. Read, agent, 27 State street, Boston, or to S. Witt, agent, Albany.

JAMES BARNES,
Superintent and Engineer.

Western Railroad Office,
Springfield, April 1, 1846. 14 1y

MANUFACTURE OF PATENT WIRE Rope and Cables for Inclined Planes, Standing Ship Rigging, Mines, Cranes, Tillers etc., by JOHN A. ROEBLING, *Civil Engineer*,
Pittsburgh, Pa.

These Ropes are in successful operation on the planes of the Portage Railroad in Pennsylvania, on the Public Slips, on Ferries and in Mines. The first rope put upon Plane No. 3, Portage Railrord, has now run 4 seasons, and is still in good condition. 2v19 1y

BACK VOLUMES OF THE RAILROAD JOURNAL for sale at the office, No. 23 Chambers street.

RAILROAD IRON.—The subscriber having taken contrats for all the Railroad Iron he can manufacture at his Iron Works at Trenton, until July next, will gladly receive orders for any quantity to be delivered after that time, not exceeding thirty tons per day. Also has on hand and will make to order Bar Iron, Braziers' Rods, Wire Rods and Iron Wires of all sizes, warranted of the best quality. Also manufactures and has on hand Refined American Isinglass, warranted equal in strength to the Russian. Also on hand a constant supply of Glue, Neats' Oil, &c. &c.

PETER COOPER, 17 Burling Slip.
New York, January 23d, 1846. 1y 10

C. J. F. BINNEY,

GENERAL COMMISSION MERCHANT and Agent for Coal, and also Iron Manufactures, etc.

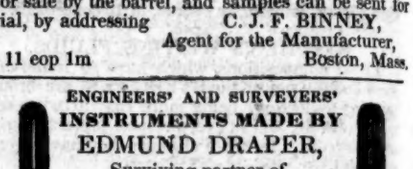
No. 1 CITY WHARF, Boston.
Advances made on Consignments.
Refer to Amos Binney, *Boston.*
Grant & Stone, } *Philadelphia.*
Brown, Earl & Erringer, }
Weld & Seaver, *Baltimore.*
December 8, 1845. 1m 50

SCRIBNER'S ENGINEERS' AND MECHANICS' COMPANION. For sale at this office. Price $1·50.

LARD OIL FOR MACHINERY, ETC.—Winter pressed, cleansed from gum, and manufactured expressly for engines and machinery of all kinds, railroads, steamboats, woollen and other manufactures, and for burning in any lamp without clogging the wick. Engineers of railroads and others who have used this oil, and to whom reference can be made, give it preference over the best sperm for its durability, and not requiring to be cleaned off like that, and costing about two-thirds the price. For sale by the barrel, and samples can be sent for trial, by addressing

C. J. F. BINNEY,
Agent for the Manufacturer,
11 eop 1m Boston, Mass.

ENGINEERS' AND SURVEYERS'
INSTRUMENTS MADE BY
EDMUND DRAPER,
Surviving partner of
STANCLIFFE & DRAPER.



No 23 Pear street, near Third, below Walnut, Philadelphia.

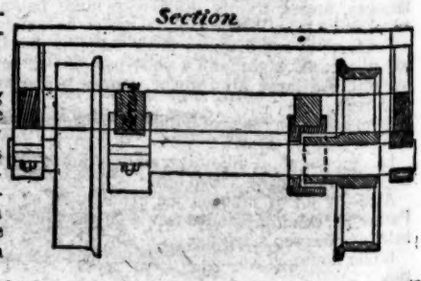
KITE'S PATENT SAFETY BEAM.

MESSRS. EDITORS.—As your Journal is devoted to the benefit of the public in general I feel desirous to communicate to you for publication the following circumstance of no inconsiderable importance, which occurred some few days since on the Philadelphia, Wilmington and Baltimore railroad.

On the passage of the evening train of cars from Philadelphia to this city, an axle of our large 8 wheeled passenger car was broken, but from the particular plan of the construction, the accident was entirely unknown to any of the passengers, or, in fact, to the conductor himself, until the train, (as was supposed from some circumstances attending the case,) had passed several miles in advance of the place where the accident occurred, whereas had the car been constructed on the common plan the same kind of accident would unavoidably have much injured it, perhaps thrown the whole train off the track, and seriously injured, if not killed many of the passengers.

Wilmington, Del., Sept. 28, 1840.

☞ The undersigned takes pleasure in attesting to the value of Mr. Joseph S. Kite's invention of the Safety Beam Axle and Hub for railroad cars. They have for some time been applied to passenger cars on this road, and experience has tested that they fully accomplish the object intended. Several instances of the fracture of axles have occurred, and in such the cars have uniformly run the whole distance with entire safety. Had not this invention been used, serious accidents must have occurred.



In short, we consider Mr. Kite's invention as completely successful in securing the safety of property and lives in railroad travelling, and should be used on all railroads in the country.

JOHN FRAZER, Agent,
GEORGE CRAIG, Superintendant,
JAMES ELLIOTT, Sup. Motive Power,
W. L. ASHMEAD, Agent.

☞ A model of the above improvement is to be seen at the New Jersey railroad and transportation office, No. 1 Hanover st., N. York. ja45

PATENT HAMMERED RAILROAD, SHIP and Boat Spikes. The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. JOHN F. WINSLOW, *Agent.*

Albany Iron and Nail Works, Troy, N. Y.

The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co. Boston. ja45

PATENT RAILROAD, SHIP AND BOAT Spikes. The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

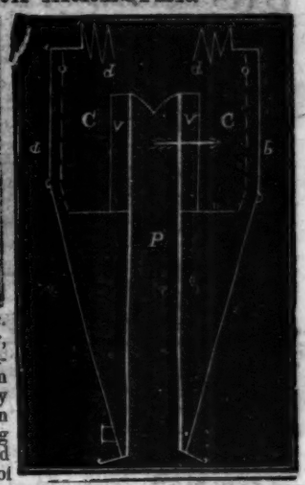
All orders directed to the Agent, Troy, N. York, will be punctually attended to.

HENRY BURDEN, *Agent.*

Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal Iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

*** Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufcturing so as to keep pace with the daily increasing demand. ja45

FRENCH AND BAIRD'S PATENT SPARK ARRESTER.



TO THOSE INTERESTED IN Railroads, Railroad Directors and Managers are respectfully invited to examine an improved SPARK ARRESTER, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

E. A. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendant Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendant Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterns, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich; G. B. Fisk, President Long Island Railroad, Brooklyn.

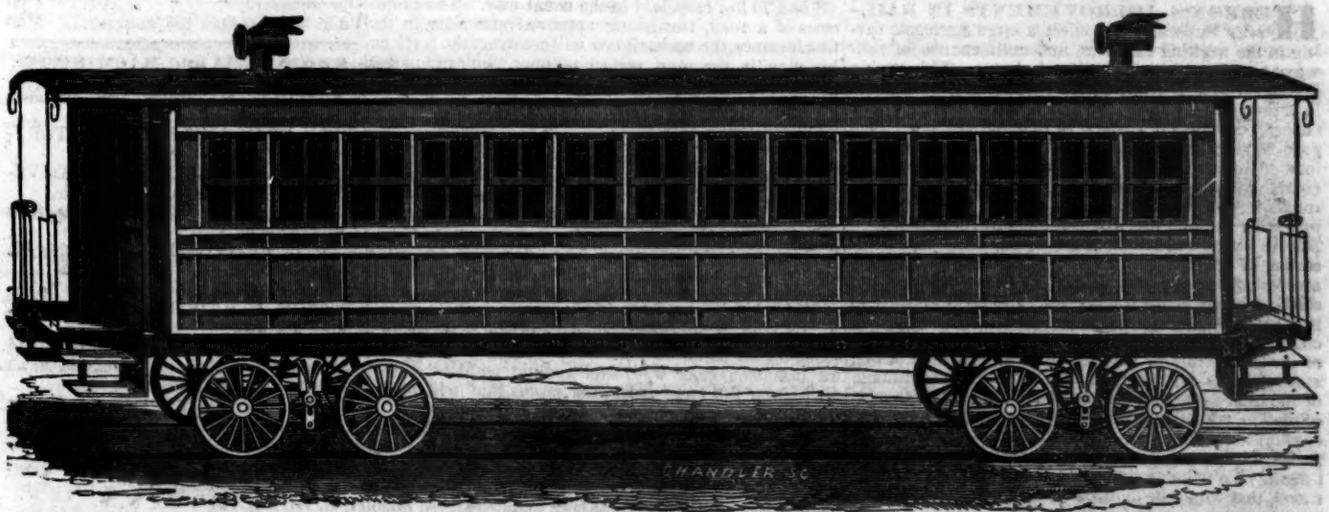
Orders for these Chimneys and Arresters, addressed to the subscribers, care Messrs. Baldwin & Whitney, of this city or to Hinckly & Drury, Boston, will be promptly executed. FRENCH & BAIRD.

N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. *Philadelphia, Pa., April* 6, 1844.

*** The letters in the figures refer to the article given in the *Journal* of June, 1844. ja45

BENTLEY'S PATENT TUBULAR STEAM BOILER. The above named Boiler is similar in principle to the Locomotive boilers in use on our Railroads. This particular method was invented by Charles W. Bentley, of Baltimore, Md., who has obtained a patent for the same from the Patent Office of the United States, under date of September 1st, 1843—and they are now already in successful operation in several of our larger Hotels and Public Institutions, Colleges, Alms Houses, Hospitals and Prisons, for cooking, washing, etc.; for Bath houses, Hatters, Silk, Cotton and Woollen Dyers, Morocco dressers, Soap boilers, Tallow chandlers, Pork butchers, Glue makers, Sugar refiners, Farmers, Distillers, Cotton and Woollen mills, Warming Buildings, and for Propelling Power, etc., etc.; and thus far have given the most entire satisfaction, may be had of D. K. MINOR, 23 Chambers st. New York.

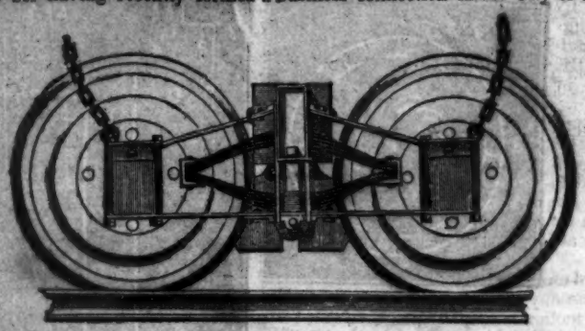
DAVENPORT & BRIDGES' CAR WORKS.



DAVENPORT & BRIDGES CONTINUE TO MANUFACTURE TO ORDER, AT THEIR WORKS, IN CAMBRIDGEPORT, MASS. Passenger and Freight Cars of every description, and of the most improved pattern. They also furnish Snow Ploughs and Chilled Wheels of any pattern and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All orders punctually executed and forwarded to any part of the country

Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minues.

RAY'S EQALIZING RAILWAY TRUCK.—THE SUBSCRIBER having recently formed a business connection in the City of New



York, expressly for the manufacture of the newly patented and highly approved Railroad Truck of Mr. Fowler M. Ray, is ready to receive orders for building the same, from Railroad Companies and Car Builders in the United States, and elsewhere.

The above Truck has now been in use from one to two years on several roads a sufficient length of time to test its durability, and other good qualities, and to satisfy those who have used it, as may be seen by reference to the certificates which follow this notice.

There have been several improvements lately introduced upon the Truck, such as additional springs in the bolster of passenger cars, making them delightful riding cars—adapting it to tenders, trucks forward of the locomotive, and freight cars, which, with its original good qualities, make it in all respects the most desirable truck now offered to the public.

Orders for the above, will, for the present, be executed at the New York Screw Mill, corner 33d street and 3d avenue, (late P. Cooper's rolling mills) and at the Steam Engine Shop of T. F. Secor & Co., foot of 9th street, East river, (of which firm the subscriber was late a partner) under the immediate supervision of Mr. Ray himself.

Several sets of trucks containing the latest improvements have recently been turned out for the New York and Erie railroad, and the New Jersey Transportation company, which may be seen upon said roads.

The patronage of Railroad Companies and Car Builders is respectfully solicited.

New York, May 4, 1846. W. H. CALKINS, and Others.

To all whom it may concern:—This is to certify that the New Haven, Hartford and Springfield railroad co., have had in use six sets of F. M. Ray's patent trucks for the last 20 months, during which time it appears to me, they have proved to be the bes and most economical truck now in use.

[Signed,] WILLIAM ROE, Sup't of Power.

I certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Philadelphia and Reading railroad for some time past, under a passenger car.

For simplicity of construction, economy in cost, lightness of material, and extreme ease of motion, I consider it the best truck we have ever used. Its peculiar make also renders it less liable to be thrown off the track, when passing over any obstruction. We intend using it extensively under the passenger and freight cars of the above road.

Reading, Pa., October 6, 1845. [Signed,] G. A. NICOLL, Sup,t Transportation, etc., Philadelphia and Reading Railroad.

To all whom it may concern:—This is to certify that the N. Jersey Railroad and Transportation company have used Fowler M. Ray's Truck for the last seven months, during which time it has operated to our entire satisfaction. I have no hesitation in saying that it is the simplest and most economical truck now in use. [Signed,] T. L. SMITH,

Jersey City, November 4, 1845. N. Jersey Railroad and Transp. Co.

This is to certify that F. M. Ray's Patent Equalizing Railroad Truck has been in use on the Long Island railroad for the last year, under a freight car. For simplicity of construction, economy in cost, lightness of material and ease of motion, I consider it equal to any truck we have in use.

Long Island Railroad Depot, Jamaica November 12, 1845. } [Signed,] JOHN LEACH, Sup't Motive Power.

HERRON'S PATENT AMERICAN RAILWAY TRACK,

As seen stripped of the top ballasting

HERRON'S IMPROVEMENTS IN RAIL-way Superstructure effect a large aggregate saving in the working expenses, and maintenance of railways, compared with the best tracks in use. This saving is effected—1st, Directly by the amount of the increased load that will be hauled by a locomotive, owing to the superior evenness of surface, of line and of joint. This gain alone may amount to 20 per cent. on the usual load of an engine.—2d, In consequence of the thorough combination, bracing, and large bearing surface of this track, it will be maintained in a better condition than any other track in use, at about one-third the expense.—3d, As action and reaction are equal, a corresponding saving of about two-thirds will be effected in the *wear* and *tear* of the *engines* and *cars*, by the *even surface* and *elastic structure* of the track.—4th, The great security to life, and less liability to accident or damage, should the engine or cars be thrown off the rails.—5th, The absence of jar and vibration, that shake down retaining walls, embankments and bridges.—6th, The great advantage of the high speed that may be safely attained, with ease of motion, reduction of noise, and consequently increased comfort to the traveller.—7th, The really *permanent* and perfect character of the Way, insuring regularity of transit. To which may be added the great increase of travel, that would be induced by the foregoing qualities to augment the revenue of the railroad.

The cost of the Patent track will depend on the quantity and cost of iron and other materials; but it will not exceed, even including the preservation of the timber, the average cost of the tracks on our principal railroads. Generally, the timber structure, fastenings and workmanship, exclusive of the cost of the iron rails, will be from $2,300 to $4,000 per mile. On this structure, rails of from 40 to 50 lbs. per yard, will be equal in effect to 60 and 70 lbs. rails laid in the usual way. The proprietors of a road, furnishing approved materials in the first instance, the undersigned will construct the track on his plan in the most perfect manner, with recent improvements, for one thonsand dollars per mile. And he will farther contract to maintain said track for the period of ten years, furnishing such preserved timber and iron fastenings as may be required, and keeping said track in *perfect adjustment*, under any trade not exceeding 100,000 tons per annum, or its equivalent in passenger transportrtion, for *Two hundred dollars per mile per annum.** To insure the faithful performance of this contract, he will pledge one-fourth of the cost of construction, with the accruing interest thereon, regularly vested, until the completion of the contract. So that a company, by securing payment to the undersigned at the specified period, will have only $750 per mile to pay for the workmanship on the track, without any charge being made for the use of the patent, the subsequent payments, for maintenance of way, and amount withheld, being made from the large margin of profits that will result from its use.

JAMES HERRON.
Civil Engineer and Patentee.
No. 277 *South Tenth St., Philadelphia.*

* A general average of the repairs done on six of the most successful railroads in this country, for a period of from six to eight years' use has been found to exceed $625 per mile per annum, exclusive of renewal of rails. But few roads in this country carry as much as 100,000 tons per annum. When a road exceeds that quantity, the repairs due to the additional tonnage, up to 200,000 tons, will be charged at one mill per ton; over the latter, and not exceeding 300,000 tons, nine-tenths of a mill, etc. Where there are two tracks to maintain, a large reduction upon those rates will be made. 1y1

THE AMERICAN RAILROAD JOURNAL is the only periodical having a general circulation throughout the Union, in which all matters connected with public works can be brought to the notice of all persons in any way interested in these undertakings. Hence it offers peculiar advantages for advertising times of departure, rates of fare and freight, improvements in machinery, materials, as iron, timber, stone, cement, etc. It is also the best medium for advertising contracts, and placing the merits of new undertakings fairly before the public.

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ROGERS, KETCHUM AND GROSVENOR, Patterson, N. J. (*See Adv.*)
S. VAIL, Speedwell Iron Works, near Morristown, N. J. (*See Adv.*)
NORRIS, BROTHERS, Philadelphia Pa. (*See adv.*)
KITE'S Patent Safety Beam. (*See Adv.*)
FRENCH & BAIRD, Philadelphia, Pa. (*See Adv.*)
NEWCASTLE MANUFACTURING COMPANY, Newcastle, Del. (*See Adv.*)
ROSS WINANS, Baltimore, Md.
CYRUS ALGER & Co., South Boston Iron Company.
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